United States
Department of
Agriculture

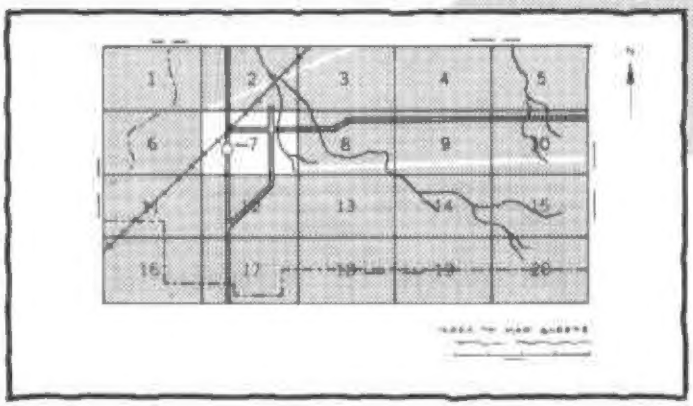
Soil
Conservation
Service

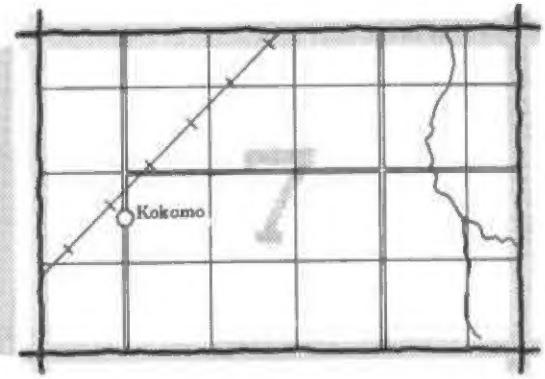
In Cooperation with
the Louisiana
Agricultural
Experiment Station
and the Louisiana
State Soil and
Water Conservation
Committee

Soil Survey of Jefferson Parish Louisiana

HOW TO USE

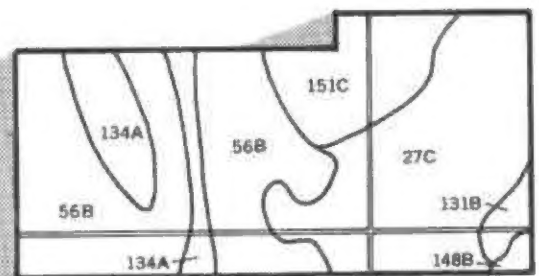
1. Locate your area of interest on the "Index to Map Sheets" (the last page of this publication).



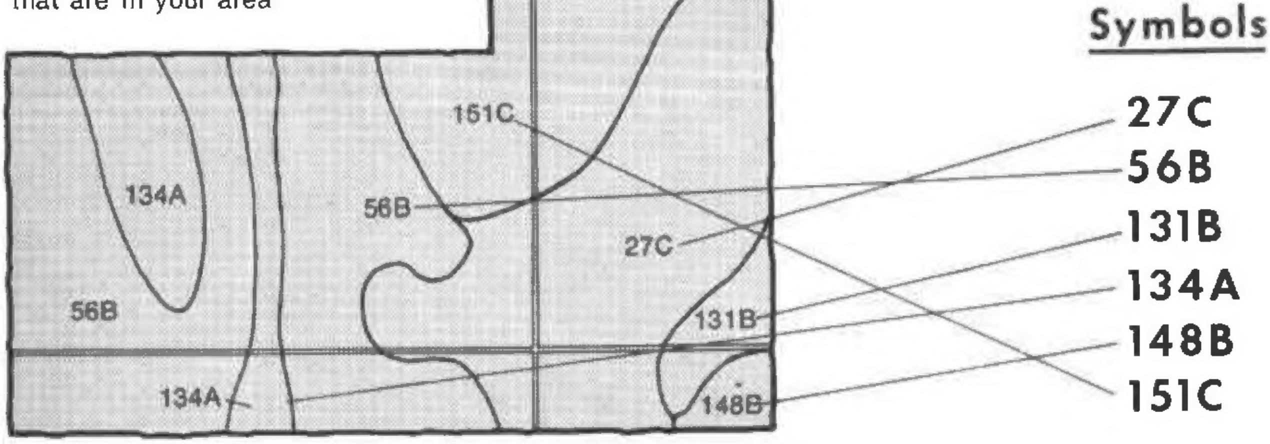


2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.

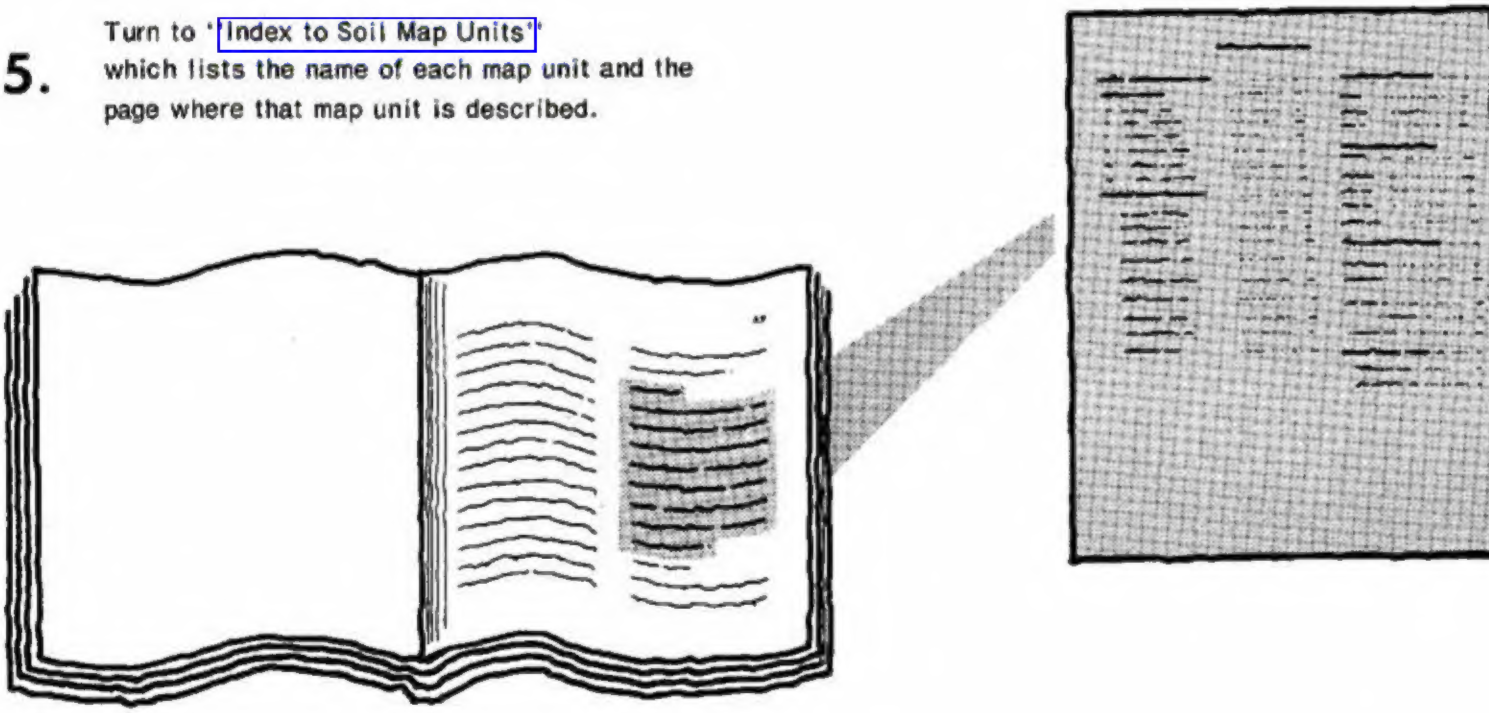


4. List the map unit symbols that are in your area

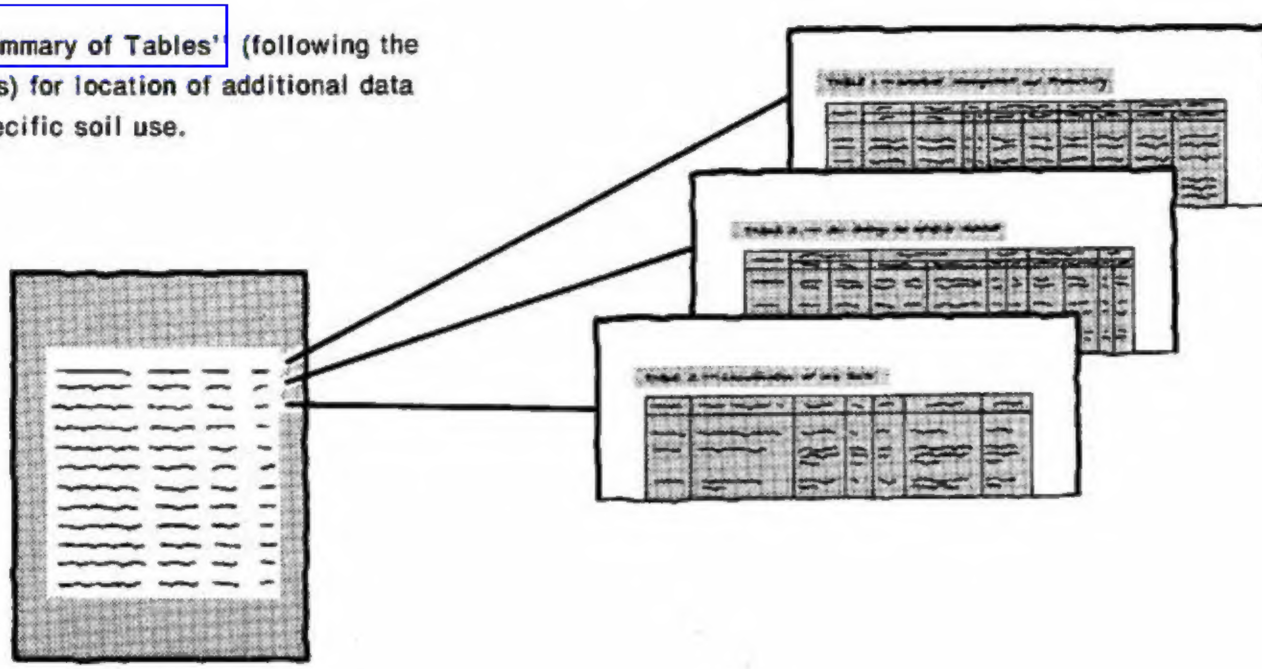


THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.



7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; for specialists in wildlife management, waste disposal, or pollution control.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was performed in the period 1977-79. Soil names and descriptions were approved in 1980. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1980. This survey was made cooperatively by the Soil Conservation Service, the Louisiana Agricultural Experiment Station, and the Louisiana State Soil and Water Conservation Committee. It is part of the technical assistance furnished to the Crescent Soil and Water Conservation District.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

Cover: Jefferson Parish is about 70 percent marshland. This area of Allemands muck provides habitat for wetland wildlife.

Contents

Soil series

Issued January 1983

Index to map units

Summary of tables

Foreword

This soil survey contains information that can be used in land-planning programs in Jefferson Parish, Louisiana. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

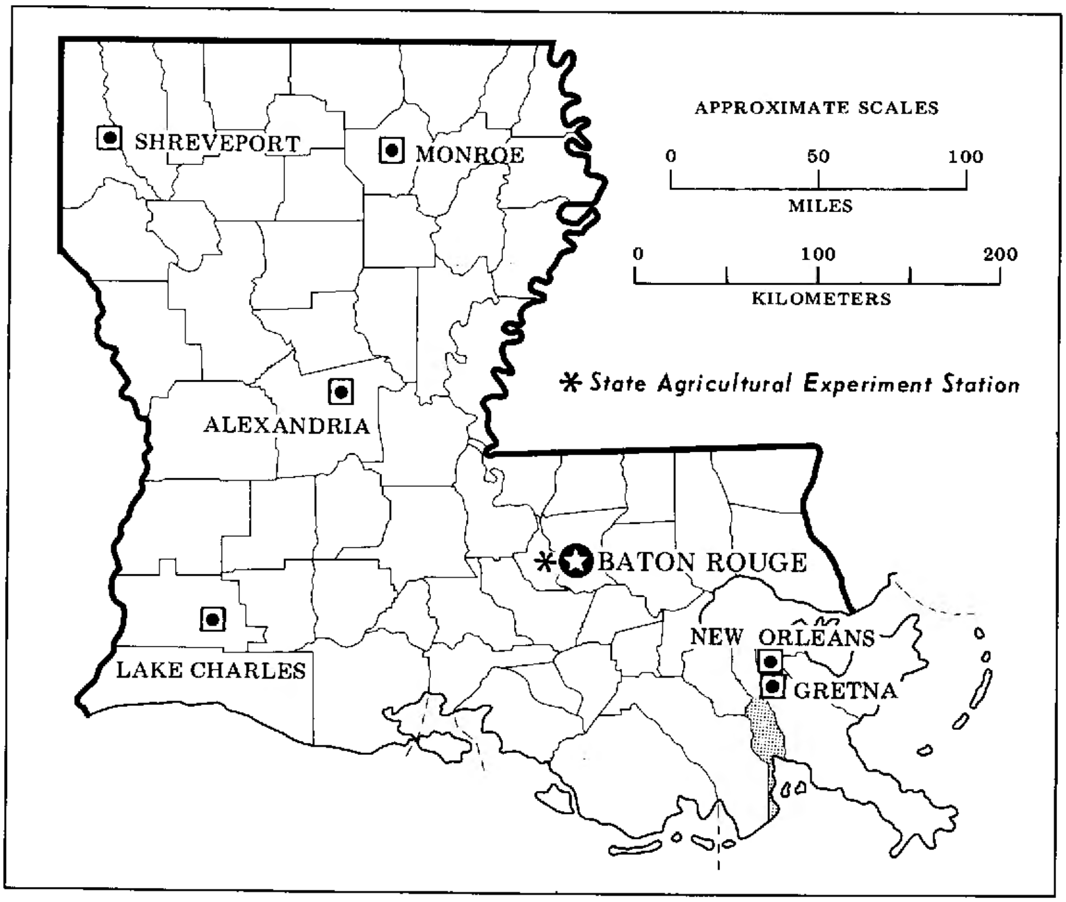
This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

Harry A. Rucker

Harry S. Rucker
State Conservationist
Soil Conservation Service



Location of Jefferson Parish in Louisiana.

Soil survey of
Jefferson Parish, Louisiana

By Dayton Matthews, Soil Conservation Service

Fieldwork by Dennis Daugereaux, Karen Wesche, Kenneth Murphy, Kilren Vidrine, and Dayton Matthews, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service
in cooperation with Louisiana Agricultural Experiment Station
and Louisiana State Soil and Water Conservation Committee

JEFFERSON PARISH, in southeastern Louisiana, has a total area of 415,360 acres of which 236,416 acres is land and 178,944 acres is large water areas—streams, lakes, and bays of the Gulf of Mexico. This parish is bordered by Lake Pontchartrain on the north, the Gulf of Mexico on the south, St. Charles and Lafourche Parishes on the west, and Orleans and Plaquemines Parishes on the east. In 1980, according to the census, the population of the parish was 450,600. Most of this population is centered in several municipalities in the northern part of the parish that are within the metropolitan area of New Orleans. This parish is chiefly rural and within the broad, coastal marshes of the Gulf of Mexico. Presently, the trend indicates that urban areas are expanding rapidly and areas of marshes and swamps are decreasing.

The parish is entirely within the Mississippi River Delta. The natural levees of the Mississippi River and its distributaries are dominated by firm, loamy and clayey soils. These soils make up about one-third of the total land area of the parish and are developed almost entirely for urban uses. An extensive system of manmade levees protects these soils from flooding. The remaining two-thirds of the land area of the parish consists mainly of ponded and frequently flooded, mucky soils in marshes and swamps. They are used mainly as habitat for wetland wildlife and for recreation. Large acreages of former marshes and swamps have been drained and developed for urban uses. Elevation ranges from about 12 feet above sea level on the natural levees along the Mississippi River to about 5 feet below sea level in the former marshes and swamps that have been drained. However, most of the undrained marshes and swamps range in elevation from sea level to about 1 foot above sea level.

Jefferson Parish was once agriculturally important and had large farms and plantations that produced sugarcane, cotton, rice, tobacco, indigo, and citrus trees. In the past 50 years, urban development has progressed rapidly, and almost all of the farmland has been taken over for industrial, business, and residential uses. Only a few small areas of cropland, woodland, and pasture remain.

The first soil survey of parts of Jefferson Parish was published in 1903 (*10*). Other soil surveys were published for parts of Jefferson Parish in 1970 (*12*), in 1977 (*15*), and in 1978 (*16*). This survey updates the earlier surveys and provides additional information.

General nature of the parish

This section gives general information concerning the parish. Climate, transportation, water resources, history, and industry are briefly discussed. Grand Isle, a barrier island in the Gulf of Mexico, is also discussed.

Climate

Prepared by the National Climatic Center, Asheville, North Carolina.

In Jefferson Parish, the long summers are hot and humid, but the coastal area is frequently cooled by sea breezes. Winters are warm; occasionally, the season is interrupted by incursions of cool air from the north. Snowfall is rare. Rains occur throughout the year, and precipitation is adequate for all crops.

Table 1 gives data on temperature and precipitation for the survey area as recorded at New Orleans, Louisiana, in the period 1955 to 1977. Table 2 shows probable dates of the first freeze in fall and the last freeze in spring. Table 3 provides data on length of the growing season.

In winter the average temperature is 54° F, and the average daily minimum temperature is 44°. The lowest temperature on record, which occurred at New Orleans on January 24, 1963, is 14°. In summer the average temperature is 81°, and the average daily maximum temperature is 90°. The highest recorded temperature, which occurred at New Orleans on June 27, 1967, is 98°.

Growing degree days are shown in table 3. They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (50° F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The total annual precipitation is 59 inches. Of this, 33 inches, or 56 percent, usually falls in April through September, which includes the growing season for most crops. In 2 years out of 10, the rainfall in April through September is less than 26 inches. The heaviest 1-day rainfall during the period of record was 9.8 inches at New Orleans on May 31, 1959. Thunderstorms occur on about 70 days each year, and most occur in summer.

The average relative humidity in midafternoon is about 65 percent. Humidity is higher at night, and the average at dawn is about 90 percent. The sun shines 60 percent of the time possible in summer and 50 percent in winter. The prevailing wind is from the southeast. Average windspeed is highest, 10 miles per hour, in spring. Every few years, a hurricane crosses the parish.

Transportation

Jefferson Parish is served by one major air transport center and several minor centers. The New Orleans International Airport is located in Jefferson Parish. It provides service for 16 scheduled airlines, which schedule about 300 arrivals and departures daily. These airlines provide direct service to most major cities in the United States and Latin America. In 1977, the airport handled about 2,783,000 passengers and 22,000,000 tons of mail and freight.

The parish is served by six major railroads that connect to every major railroad system in the United States. Four motor transit companies provide passenger service between New Orleans and Jefferson Parish. Numerous motor freight carriers also serve the parish. In the parish, there are two U.S. highways, one interstate highway, and numerous paved state highways and parish roads.

The Mississippi River and the Intracoastal Waterway pass through the parish. These waterways are part of a 19,000-mile water transportation system that serves much of the central part of the United States as well as the Gulf coastal area.

Water resources

By Charles R. Akers, geologist, Soil Conservation Service

Surface water.—The principal source of surface water in Jefferson Parish is the Mississippi River. Four large public water suppliers in the parish pump approximately 38,900,000 gallons per day from this river (*18*).

Ground water.—Ground water is produced from several types of sand aquifers in Jefferson Parish. The major aquifers are (1) the shallow aquifers, (2) the 200-foot sand aquifer, (3) the 400-foot sand aquifer, (4) the 700-foot sand aquifer, and (5) the 1,200-foot sand aquifer.

The shallow aquifers in the parish are of three types: small, isolated near-surface sands; point bars; and distributary channel deposits. The near-surface sands are of little importance as aquifers for water sources because they do not have potable water and they are not extensive enough to supply large quantities of water (*17*). Point bars are deposits of poorly graded fine sand that are on the inside bends of the Mississippi River and grow riverward as the bends migrate. A test well in the point bar near the Jefferson-St. Charles Parish line penetrated fine to medium sand capable of supplying moderate yields. Most wells in point bars yield only a few gallons per minute. Distributary channel deposits of sand are in the Metairie Branch of the St. Bernard Delta located between the Mississippi River and Lake Pontchartrain (*8, 17*). Water obtained from this source has a chloride content of more than 250 parts per million (*17*).

Although the 200-foot sand aquifer is present in Jefferson Parish, only small areas yield water that has a chloride content of less than 250 parts per million. A small area of the aquifer near St. Charles Parish and Lake Pontchartrain and a small area near Lake Cataouatche have the potential to yield freshwater.

The 400-foot sand aquifer is present throughout most of the parish. However, water that contains less than 250 parts per million of chloride can only be obtained from this aquifer in the northwest corner of the parish. Although withdrawals of water from the 400-foot sand

aquifer are small in Jefferson Parish, the aquifer is heavily pumped in St. Charles Parish.

The 700-foot sand aquifer is the principal one for the New Orleans area. However, only the part of Jefferson Parish that is north of the Mississippi River obtains water from this aquifer, and the water has less than 250 parts per million of chloride. In this limited area, approximately 8.75 million gallons of water per day were pumped from this aquifer in 1963. Projections made estimate that the water level of the 700-foot sand aquifer will decline from a 1965 range of -40 to -90 feet to a range of -100 to -190 feet by 1985.

The water from the 1,200-foot sand aquifer is highly mineralized. The concentration of dissolved solids is less than 10,000 parts per million only in the area along Lake Pontchartrain. Water levels have declined about 30 feet in 60 years (*17*). This indicates that some sort of hydraulic connection exists between the 700-foot sand aquifer and the 1,200-foot sand aquifer.

History

Jefferson Parish was organized in 1825. It was named for President Thomas Jefferson, who was in office at the time of the Louisiana Purchase of 1803. The earliest settlers were of French descent and arrived in the early 1700's. An influx of settlers of Anglo-Saxon descent followed the Louisiana Purchase. These settlers mingled and intermixed easily with the native Creole population. The settlers developed large sugar plantations along the Mississippi River.

In 1805, Jean Lafitte came to Louisiana from Haiti and organized the "Privateers of Barataria." The center for his operations was on the western tip of Grand Terre Island which fronted Barataria Pass and the Gulf of Mexico. Lafitte became a legend for his preying on Spanish vessels in the Gulf and for smuggling slaves and contraband goods through the swamps and marshes into New Orleans. Federal forces raided Grand Terre Island in September 1814 and destroyed Lafitte's operation. Lafitte escaped into the marshes, but he later joined with Andrew Jackson to help defend New Orleans against the British. The federal government has authorized the creation of the Jean Lafitte National Park, which will be located mostly in Jefferson Parish.

Jefferson Parish was an agriculturally important area in its early history as large plantations flourished on the fertile soils along the Mississippi River. Most of these plantations were completely self-sufficient. They not only provided their own food but also had their own schools, hospitals, and churches. The second quarter of the 19th century was called the "golden age" of plantation life.

In 1727, the Jesuits were granted a tract of land near New Orleans on the condition that they educate the children of New Orleans. The Jesuits brought with them oranges, figs, sugarcane, and indigo.

As early as 1735, rice, tobacco, and indigo were cultivated with success, and fig and orange orchards thrived everywhere. Although cotton grew well, planters experienced great difficulty in separating the cotton lint from the seed.

Sugarcane was introduced in 1751, and although no one was successful in extracting the sugar then, the cane was either sold on the market or used in the manufacture of a kind of rum called "tafia." In 1794, agriculture in the parish prospered when Etienne De Bore developed a procedure for the granulation of sugar.

In the aftermath of the Civil War, the large plantations were divided into small farms. Industries such as foundries, shipyards, and sawmills began to gain importance. Urban areas grew, and today urban expansion has virtually eliminated all cropland in the parish, except in a few small areas. A 1970 survey indicated that only 1,100 persons in the parish were employed in agriculture, forestry, and fishing.

Jefferson Parish has six incorporated towns or cities. Most of these were incorporated in the last half of the 19th Century or the beginning of the 20th century. The town of Jean Lafitte became the latest addition in 1974. The other cities and towns are Kenner, Gretna, Harahan, Westwego, and Grand Isle. There are many unincorporated communities.

Jefferson Parish operates under a home rule type of government. The seat of parish government is Gretna, where it has been since 1884. However, government offices are located on both the West Bank and East Bank of the Mississippi River for the convenience of the residents.

Grand Isle

Grand Isle is a barrier island in the Gulf of Mexico and is separated from other developed parts of Jefferson Parish by many miles of marsh. In 1980, according to the census, the permanent population was 1,987. The population increases significantly in summer.

In the early 1800's there were many plantations and cattle ranches on the island. Later, fishermen and vegetable farmers were the main inhabitants of Grand Isle. After the Civil War, the large sugar plantations were sold at auction and divided into small plots for farms or resort hotels. Presently, Grand Isle is the location of the fleet of a prosperous fishing industry; the island has been rated as one of the top ten sport fishing locations in the world. The sandy beaches, which are several miles long, have year-round vacation facilities. In addition, Grand Isle State Park has been established on this island.

Industry

Jefferson Parish is largely industrialized. The largest employer in the state, a major shipyard, is located in this parish. During the mid-1900's, the establishment of oil

and gas industries created a population boom. A chain reaction mushroomed into a hub of industrial activity that characterizes Jefferson Parish. Manufacturing plants and industry grew rapidly along the Mississippi River and the canals. The west bank of Harvey Canal, which leads from the river to the Gulf of Mexico, is the site of the largest manufacturing and shipping center in Jefferson Parish.

How this survey was made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They observed the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; and the kinds of native plants or crops. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby parishes and in more distant places. They classified and named the soils according to nationwide uniform procedures. They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, fields, roads, and other details that help in drawing boundaries accurately. The soil maps at the back of this publication were prepared from aerial photographs.

The areas shown on a soil map are called map units. Most map units are made up of one kind of soil. Some are made up of two or more kinds. The map units in this survey area are described under "General soil map units" and "Detailed soil map units."

While a soil survey is in progress, samples of some soils are taken for laboratory measurements and for engineering tests. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists. For example, data on crop yields under defined management are assembled from farm records and from field or plot experiments on the same kinds of soil.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when the laboratory data and other data have been assembled. The mass of detailed information then needs to be organized so that it can be used by farmers, woodland managers, engineers, planners, developers and builders, home buyers, and others.

General soil map units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. The characteristics of each unit are described in this section. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The general soil map units in this survey have been grouped into four general landscapes. Descriptions of each of the broad groups and the map units in each group follow.

Soils on the natural levees that are protected from flooding

This group consists mainly of level, poorly drained and somewhat poorly drained, clayey and loamy soils that are on the natural levees of the Mississippi River and its distributaries. Large earthen levees protect these soils from flooding by the Mississippi River.

This map unit makes up about 18 percent of the land area of the parish. Most of these soils are in urban uses. Wetness, flooding from backwaters, and the shrinking and swelling of the subsoil are the main limitations for urban uses.

1. Sharkey-Commerce

Level, poorly drained and somewhat poorly drained soils that have a clayey or loamy surface layer and clayey subsoil or that are loamy throughout

The soils of this map unit are on the natural levees of the Mississippi River and its distributaries. Elevation ranges from about 1 foot to 12 feet above sea level. Slopes are long and smooth and less than 1 percent.

This map unit makes up about 18 percent of the land area of the parish. It is about 50 percent Sharkey soils, 40 percent Commerce soils, and 10 percent soils of minor extent.

The poorly drained Sharkey soils are in intermediate and low positions on the natural levees. These soils have a surface layer of dark gray or very dark grayish brown silty clay loam or clay. The subsoil and underlying material are dark gray, mottled clay.

The somewhat poorly drained Commerce soils are in intermediate and high positions on the natural levees. These soils have a surface layer of very dark grayish brown silt loam or silty clay loam and subsoil of dark grayish brown or grayish brown, mottled silt loam. The underlying material is grayish brown, mottled loam and silty clay loam.

Of minor extent are the somewhat poorly drained Vacherie soils in intermediate positions where the natural levees of the Mississippi River were breached by former floods. Also, small, narrow areas of Sharkey and Commerce soils are between the Mississippi River and protection levees; these soils are frequently flooded.

Most of the soils in this unit are in urban uses. A small acreage is used for crops and pasture or as woodland; some idle land has been reserved for future urban uses.

These soils are poorly suited to moderately well suited to building site development and intensively used recreation areas. They are poorly suited to sanitary facilities. Wetness, moderately slow permeability and very slow permeability, and the shrinking and swelling of the subsoil are the main limitations. In addition, the Sharkey soils are subject to rare flooding after unusually severe storms.

These soils are well suited to pasture and woodland. They are well suited or moderately well suited to cultivated crops. A good drainage system and fertilizer are needed for optimum crop and forage production. The soils are well suited to the production of hardwood trees although wetness can limit the use of equipment.

Soils in marshes and swamps that are frequently flooded and ponded

The five map units in this group consist mainly of level, very poorly drained, mucky soils that are in marshes and swamps. These soils are flooded or ponded most of the time.

These map units make up about 66 percent of the land area of the parish. Most of the area is in native vegetation and is used for recreation and as habitat for wetland wildlife.

2. Barbary

Level, very poorly drained soils that have a thin mucky surface layer and clayey underlying material; in swamps

The soils of this map unit are in swamps that are flooded or ponded most of the time. Elevation ranges from sea level to about 2 feet above sea level. Slope is less than 0.2 percent.

This map unit makes up about 5 percent of the land area of the parish. It is about 90 percent Barbary soils and 10 percent soils of minor extent.

Barbary soils have a thin surface layer of dark brown, semifluid muck and underlying material of dark gray, semifluid clay and mucky clay.

Of minor extent are the poorly drained Sharkey soils on narrow ridges.

Most of the acreage is in native trees and aquatic vegetation. It is used for recreation and as habitat for wetland wildlife. A small acreage has oil and gas wells.

These soils are well suited to recreation uses and as habitat for wetland wildlife. They provide habitat for waterfowl, furbearers, alligators, swamp rabbits, and nongame birds. This unit is part of an estuary that contributes to the support of many species of marine fishes and crustaceans. Hunting and other outdoor activities are popular in areas of this unit.

These soils are not suited to crops, pasture, woodland, or urban uses. The limitations of flooding, wetness, salinity, and low strength are too severe for these uses.

3. Kenner-Allemands

Level, very poorly drained soils that have a moderately thick mucky surface layer and mucky and clayey underlying material; in freshwater marshes

The soils of this map unit are in freshwater marshes that are flooded or ponded most of the time. Elevation ranges from sea level to about 1 foot above sea level. Slope is less than 0.5 percent.

This map unit makes up about 14 percent of the land area of the parish. It is about 80 percent Kenner soils, 19 percent Allemands soils, and 1 percent soils of minor extent.

The Kenner soils are in interbasin areas between natural streams. They are stratified, semifluid muck and semifluid clay throughout.

The Allemands soils are near the natural streams and have a moderately thick surface layer of semifluid muck and underlying material of semifluid clay, mucky clay, and muck.

Of minor extent are the very poorly drained Larose soils on low ridges that have subsided below sea level and the very poorly drained Clovelly and Lafitte soils in areas where the brackish marsh has intruded into areas of this map unit. Many small ponds and perennial streams are throughout the unit.

Most of the soils in this unit are in native vegetation and used for recreation and as habitat for wetland wildlife. A small acreage has oil and gas wells.

These soils are well suited to use for recreation and as a habitat for wetland wildlife. They provide habitat for many species of wetland wildlife. Hunting, fishing, and other outdoor activities are popular in areas of this unit.

These soils are not suited to crops, pasture, woodland, or urban uses. The limitations of flooding, wetness, and low strength are too severe for these uses.

4. Lafitte-Clovelly

Level, very poorly drained soils that have a thick or moderately thick mucky surface layer and clayey underlying material; in brackish marshes

The soils of this map unit are in brackish marshes that are flooded or ponded most of the time. Elevation ranges from sea level to about 1 foot above sea level. Slope is less than 0.5 percent.

This map unit makes up about 36 percent of the land area of the parish. It is about 68 percent Lafitte soils, 20 percent Clovelly soils, and 12 percent soils of minor extent.

The Lafitte soils are in broad basins between natural streams and have a thick surface layer of semifluid, saline muck and underlying material of semifluid, saline clay and silty clay loam.

The Clovelly soils are on submerged ridges along natural streams. They have a moderately thick surface layer of semifluid, saline muck and underlying material of semifluid, saline clay.

Of minor extent are the very poorly drained Allemands soils in adjacent areas of freshwater marsh and the very poorly drained Scatlake and Timbalier soils in adjacent areas of saline marsh. Many small ponds and perennial streams are in most areas.

Most of the soils in this unit are in native vegetation and are used for recreation and as habitat for wetland wildlife. A small acreage has oil and gas wells.

These soils are well suited to use as habitat for wetland wildlife. They provide suitable habitat for many species of wetland wildlife. Hunting, fishing, and other outdoor activities are popular in areas of this unit. This unit is part of the estuary that contributes to the support of marine life in the Gulf of Mexico.

These soils are not suited to crops, pasture, woodland, or urban uses. The limitations of flooding, wetness, salinity, and low strength are too severe for these uses.

5. Timbalier-Scatlake

Level, very poorly drained soils that have a thick or thin mucky surface layer and clayey underlying material; in saline marshes

The soils of this map unit are in saline marshes that are flooded or ponded most of the time. Elevation ranges from sea level to about 1 foot above sea level. Slope is less than 0.5 percent.

This map unit makes up about 7 percent of the land area of the parish. It is about 65 percent Timbalier soils, 25 percent Scatlake soils, and 10 percent soils of minor extent.

The Timbalier soils are in broad basins between natural streams. They have a thick surface layer of semifluid, saline muck and underlying material of semifluid, saline clay.

The Scatlake soils are near natural streams and have a thin surface layer of semifluid, saline muck and underlying material of semifluid, saline clay.

Of minor extent are the somewhat poorly drained Felicity soils on narrow, sandy ridges and the very poorly drained Clovelly and Lafitte soils in areas where the brackish marsh intrudes into areas of this unit. Many small ponds and perennial streams are in most areas.

These soils are not suited to crops, pasture, or urban uses. The limitations of flooding, wetness, and low strength are too severe for these uses. These soils are poorly suited to woodland. Special equipment is needed to harvest trees because of the low load-supporting capacity of the soils.

These soils are well suited to use as habitat for wetland wildlife. They provide habitat for many species of wetland wildlife. Hunting, fishing, and other outdoor activities are popular in areas of this unit. This unit is part of an estuary that contributes to the support of many species of marine fishes and crustaceans in the Gulf of Mexico.

6. Scatlake

Level, very poorly drained soils that have a thin mucky surface layer and clayey underlying material; in saline marshes

The soils of this map unit are in saline marshes that are flooded or ponded most of the time. Elevation ranges from sea level to about 1 foot above sea level. Slope is less than 0.5 percent.

This map unit makes up about 4 percent of the land area of the parish. It is about 98 percent Scatlake soils and 2 percent soils of minor extent.

The Scatlake soils have a thin surface layer of semifluid, saline muck and underlying material of semifluid, saline clay.

Of minor extent are the very poorly drained Timbalier soils in broad, interlevee basins and the somewhat poorly drained Felicity soils on sandy ridges. There are many small ponds and perennial streams in most areas.

The soils in this unit are mainly in native vegetation and are used for recreation and as habitat for wetland wildlife. There are oil and gas wells in some areas.

The soils are well suited to use as habitat for wetland wildlife. They provide habitat for many species of wetland wildlife. Hunting, fishing, and other outdoor activities are popular in the area. This unit is part of an estuary that contributes to the support of many species of marine fishes and crustaceans in the Gulf of Mexico.

These soils are not suited to crops, pasture, woodland, and urban uses. The limitations of flooding, wetness, salinity, and low strength are too severe for these uses.

Soils in former marshes and swamps that are drained and protected from flooding

The two map units in this group consist mainly of level, poorly drained mucky and clayey soils in drained marshes and swamps. The soils are protected from most floods by levees and are drained by pumps. Flooding is rare, but it can occur during hurricanes or when protection levees fail.

These map units make up about 14 percent of the land area of the parish. Most of the area is developed for urban uses. Flooding, wetness, low strength, subsidence, and the shrinking and swelling of the underlying material are the main limitations if the soils are used for urban development.

7. Kenner, drained-Allemands, drained

Level, poorly drained soils that have a thick or moderately thick mucky surface layer and mucky and clayey underlying material; in former freshwater marshes

The soils of this map unit are in former marshes that are protected from most floods by levees and drained by pumps. Flooding is rare, but it can occur during hurricanes or when levees fail. Elevation ranges from sea level to about 5 feet below sea level. Slope is less than 0.5 percent.

This map unit makes up about 8 percent of the land area of the parish. It is about 55 percent Kenner, drained, soils; 35 percent Allemands, drained, soils; and 10 percent soils of minor extent.

The Kenner, drained, soils are in broad, interlevee basins. They have a thick surface layer of muck and underlying material of semifluid muck. Both the surface and underlying layers contain thin strata of clay.

The Allemands, drained, soils are in low positions near the natural levees of streams. They have a moderately thick surface layer of muck and underlying material of semifluid clay.

Of minor extent are the poorly drained Harahan and Westwego soils in slightly higher positions.

Most of the soils in this unit are developed for urban uses. A small acreage is in pasture or in idle land that has been reserved for future urban uses.

These soils are poorly suited to most urban uses. Flooding, wetness, low strength, and subsidence are the main limitations for these uses. Adequately controlling the water table and the rate of subsidence is difficult. Foundations for buildings need to be specially designed and placed on pilings.

8. Westwego-Harahan

Level, poorly drained soils that have a clayey surface layer and subsoil; in former swamps

The soils of this map unit are in former swamps that are protected from most floods by levees and are drained by pumps. Flooding is rare, but it can occur during hurricanes or when levees or pumps fail. Elevation ranges from about 1 foot above sea level to about 3 feet below sea level. Slope is less than 0.5 percent.

This map unit makes up about 6 percent of the land area of the parish. It is about 70 percent Westwego soils, 29 percent Harahan soils, and 1 percent soils of minor extent.

The Westwego soils are in low positions and have a surface layer of very dark gray, firm clay; subsoil of dark gray, firm clay; and underlying material of dark gray, semifluid clay and muck. The subsoil contains a network of permanent cracks.

The Harahan soils are in slightly higher positions and have a very dark gray surface layer; subsoil of dark gray and very dark gray, firm clay; and underlying material of gray and dark gray, semifluid clay.

Of minor extent are the poorly drained Sharkey soils on narrow ridges.

The soils in this map unit are mainly in urban uses. A small acreage is in pasture or is idle land that has been reserved for future urban uses.

These soils are poorly suited to most urban uses. Flooding, wetness, low strength, very slow permeability, and the shrinking and swelling of the subsoil are the main limitations. Adequately controlling the water table is difficult. Foundations for buildings need to be specially designed and set upon pilings.

Soils on sandy ridges that are occasionally flooded

This group consists mainly of gently undulating, somewhat poorly drained, sandy soils on narrow ridges along the Gulf of Mexico. The soils are flooded occasionally by high storm tides.

This map unit makes up about 2 percent of the land area of the parish. Most of the area is in residential, commercial, and recreation uses. It is part of a large seaside resort complex. Flooding, wetness, and salinity are the main limitations of the soils for urban or recreation uses.

9. Felicity

Gently undulating, somewhat poorly drained soils that are sandy throughout

The soils of this map unit are on ridges that are mainly near the beaches of the Gulf of Mexico. The soils are occasionally flooded by high tides during storms. Elevation ranges from about 2 to 5 feet above sea level. Slopes range from 0 to 3 percent.

This map unit makes up about 2 percent of the land area of the parish. It is about 95 percent Felicity soils and 5 percent soils of minor extent.

The somewhat poorly drained Felicity soils have a surface layer and underlying material of loamy fine sand. They are saline throughout.

Of minor extent are the very poorly drained Scatlake and Timbalier soils in low positions on the landward side of the ridges.

The soils in this unit are mainly in urban and recreation uses. A small acreage is undisturbed and is used as habitat for wetland and openland wildlife.

These soils are severely limited for most urban and recreation uses. Flooding and wetness are the main limitations. Seepage is also a problem where the soils are used for sanitary facilities.

These soils are very poorly suited to use as habitat for wetland and openland wildlife. The areas are used mainly by shore birds. Soil salinity is the main limitation for managing vegetation for wildlife habitat.

Broad land use considerations

The soils in Jefferson Parish vary widely in their potential for major land uses. Only a small acreage in the parish is used for cultivated crops and pasture because of the demand for urban uses. The acreage used for crops is mostly along the Mississippi River in the center of the parish; it is in general soil map unit 1, Sharkey-Commerce. The soils are well suited or moderately well suited to cultivated crops and pasture. Wetness is the main limitation, but a surface drainage system can be installed to overcome this problem. Flooding and ponding preclude the use of soils in other general soil map units in the parish for crops and pasture except for map units 7, Kenner, drained-Allemands, drained; and 8, Westwego-Harahan. These soils are poorly suited and moderately well suited to cultivated crops and pasture because of acidity, low strength, low elevation, and high subsidence potential.

Less than 6 percent of the total land area in the parish is woodland. The productivity is very high or high in general soil map unit 1, Sharkey-Commerce; high in map unit 8, Westwego-Harahan; and moderate in map unit 2, Barbary. The use of equipment is restricted on all soils in wet weather and severely restricted on the soils in map unit 2 all of the time. The soils in the other map units generally are not suited to use as woodland.

Most of the woodland in the parish is in map unit 2, Barbary. This map unit is adjacent to urban areas and remains undrained.

In Jefferson Parish, about 84,000 acres are classified as urban or built-up land. This includes all of the cities, towns, and installations associated with the oil and gas industries and commercial properties. In general, the soils in map unit 1, Sharkey-Commerce, have the best suitability for urban uses. Wetness and low strength are the main problems on the Commerce soils. The Sharkey soils in map unit 1 and the Harahan and Westwego soils in unit 8 are less suitable because of wetness, rare flooding, low strength, and the very high shrink-swell potential of the clayey layers. The soils in map unit 7, Kenner, drained-Allemands, drained, are below sea level and have high subsidence potential. The Felicity soils in map unit 9 are occasionally flooded and have severe limitations for urban uses. The soils in the other general soil map units in the parish are not suited to urban uses.

The suitability for intensively used recreation areas ranges from well suited to not suited. This depends on the intensity of the expected use and the properties of the soils. The soils in map units 1, 7, 8, and 9 are well suited to poorly suited to intensive recreation uses. The main limitations are low strength, high shrink-swell potential, low elevation, high subsidence potential, wetness, and flooding. Flooding and ponding are severe hazards on the soils in all other general soil map units; those soils are not suited to intensive recreation uses.

Most of the soils in the parish that are not in urban uses are well suited to use as habitat for wildlife. The soils in swamps and marshes are especially suitable as habitat for wetland wildlife. The Barbary soils in map unit 2 also provide suitable habitat for woodland wildlife.

Detailed soil map units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and management of the soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Commerce silty clay loam is one of several phases in the Commerce series.

Some map units are made up of two or more major soils. These map units are called soil associations or undifferentiated groups.

A *soil association* is made up of two or more geographically associated soils that are shown as one unit on the maps. Because of present or anticipated soil uses in the survey area, it was not considered practical or necessary to map the soils separately. The pattern and relative proportion of the soils are somewhat similar. Lafitte-Clovelly association is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Commerce and Sharkey soils, frequently flooded, is an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description.

The boundaries and names of map units in this soil survey differ from some of those in previously published soil surveys of parts of Jefferson Parish (*10, 12, 15, 16*). These differences result mainly from changes in soil series concepts and differences in map unit design.

All of the soils in Jefferson Parish were mapped at the same level of detail, except for those areas within the marshes and swamps and those areas between the protection levees and the Mississippi River. Poor accessibility limited the number of observations that could be made in most of these areas. In addition, wetness from flooding or ponding limits the use and management of these soils, and separating all of the soils in these areas would be of little importance to the land user. Where flooding or ponding are the overriding limitations for expected land use, fewer onsite observations were made and the soils were not mapped separately.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

Descriptions of the detailed soil map units follow.

1—Allemands muck, drained. This level, poorly drained organic soil is in former freshwater marshes that have been drained and are protected from most flooding. Areas of this soil range from about 40 to 3,000 acres in size. The soil is mainly in urban areas. Slope is less than 0.5 percent.

Where undisturbed, this soil typically has a surface layer of black, extremely acid or very strongly acid muck about 41 inches thick. The underlying material to a depth of about 60 inches is dark gray, slightly acid, semifluid clay. In places, buried logs and stumps are in the underlying material. In most developed areas, the

surface layer has been covered with 1 foot to 3 feet of mineral material. The organic material, in drying, shrinks and cracks; it remains cracked if rewetted.

This Allemands soil is drained by pumps and protected from most floods by levees. Under normal conditions, the water table is at a depth of 2 to 4 feet below the surface. After high intensity rains of long duration, the water table is near the surface for short periods. Flooding is rare, but it can occur during hurricanes and when water pumps or protection levees fail. Permeability is rapid in the organic surface layer and very slow in the clayey underlying material. Although the surface has been covered with mineral fill material, the cracks in the surface layer remain open and extend into the underlying material. Water and air move freely through these cracks. Natural fertility is high. The content of organic matter is very high. Available water capacity is very high. The potential of total subsidence is high.

Included in mapping are a few small areas of soils similar to Allemands muck, drained, except that the organic surface layer is only 5 to 15 inches thick. Also included are a few small areas of Allemands muck, drained, that have severely subsided and have a water table that is at the surface most of the time. The included soils make up about 15 percent of this map unit.

Most of the acreage is in urban and residential areas. Most areas are 25 to 70 percent covered by houses, streets, buildings, and parking lots; some areas are 90 percent covered. The open areas are mostly lawns, vacant lots, playgrounds, or vegetable gardens. A small acreage is in pasture or idle land that is reserved for future urban uses.

This soil is poorly suited to urban uses and intensive forms of recreation. Flooding, wetness, subsidence, low strength, and the very high shrink-swell potential are the main limitations. If the water table is lowered, the organic matter oxidizes and slowly subsides. In places, buried logs and stumps cause uneven subsidence. If dry, the organic matter is subject to burning.

If this soil is used for dwellings, pilings and specially constructed foundations are needed (fig. 1). Removing the organic material and replacing it with suitable mineral material or covering the surface with mineral material can also help to reduce subsidence where buildings, local roads and streets, and playgrounds are to be constructed. Adequate water control is needed to reduce wetness and to control the rate of subsidence. Septic tank absorption fields do not function properly in this soil; therefore, community sewage systems are needed to prevent contamination of water sources by effluent seepage. Drainage ditches and levees are difficult to construct and maintain because of the semifluid nature of the underlying mineral material and the subsidence of the organic material.

This soil is moderately well suited to pasture. Suitable pasture plants are common bermudagrass, dallisgrass, white clover, and tall fescue. Wetness is the main limitation. Adequate water control is needed. Grazing cattle may have problems walking if the surface layer becomes soft and boggy for short periods after heavy rainstorms.

This Allemands soil is in capability subclass IVw.

2—Allemands muck. This level, very poorly drained, semifluid organic soil is in freshwater marshes. It is flooded and ponded most of the time. Areas of this soil range from about 200 acres to 1,000 acres. The number of observations made in these areas was fewer than in other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soil. Slope is less than 0.5 percent.

Typically, the surface layer is very dark grayish brown, slightly acid or neutral muck about 23 inches thick. The underlying material to a depth of 55 inches is gray and dark gray, neutral and moderately alkaline clay and mucky clay. Between depths of 55 and 60 inches, the underlying material is dark brown, moderately alkaline muck.

This soil is flooded by freshwater to depths of 6 to 12 inches most of the time. During storms, floodwaters are as deep as 2 feet. The water table commonly is at or above the surface, but during periods of sustained north wind and low gulf tides, the water table is as much as 6 inches below the soil surface. This soil has a low capacity to support loads. Permeability is rapid in the organic surface layer and very slow in the clayey underlying material. The total subsidence potential is high.

Included in mapping are a few large areas of Kenner and Larose soils. The Kenner and Larose soils are in similar positions to those of the Allemands soil. The Kenner soils have thin strata of mineral and organic materials in the upper part of the profile. The Larose soils have a thinner organic surface layer than the Allemands soil. Also included in most areas are many small ponds and perennial streams. The included soils make up about 15 percent of this map unit.

The natural vegetation consists mainly of bulltongue, maidencane, alligatorweed, cattail, common rush, pickerelweed, southern wildrice, and swamp knotweed.

Most of the acreage is used as habitat for wetland wildlife and for extensive forms of recreation such as hunting and fishing. A small acreage is used for oil and gas wells.

This Allemands soil is well suited to use as habitat for wetland wildlife. Roosting and feeding areas are available for large numbers of ducks and many other species of waterfowl. This soil also provides habitat for large numbers of crawfish, swamp rabbits, white-tailed deer, American alligators, and furbearers such as mink, nutria, otter, and raccoon. The small ponds and perennial streams included in this map unit provide

Figure 1.—Wooden pilings, driven deep into the soil, help to provide support for the foundations of houses without basements on Allemands muck, drained.

habitat for significant numbers of freshwater fish. Trapping of American alligators, crawfish, and furbearers and commercial fishing are important in areas of this map unit. Water-control structures, designed for the management of habitat, are difficult to construct and maintain because of the instability of the organic material.

Unless this soil has been drained and is protected from flooding, it is not suited to crops, pasture, or woodland. Wetness, flooding, and low strength are too severe for these uses. This soil is generally too soft and boggy to support livestock grazing. Drainage and protection from flooding are possible, but extensive water control structures, such as levees and water pumps, are required. Extreme acidity, subsidence, and low strength are continuing limitations after drainage.

This soil is not suited to urban uses because of wetness, flooding, and low soil strength. Drainage is only feasible with an extensive system of levees and water pumps. The soil material is poorly suited to the construction of levees because it shrinks and cracks as it dries, causing the levees to fail.

This Allemands soil is in capability subclass VIIw.

3—Harahan clay. This level, poorly drained mineral soil is in low positions on the natural levees of the Mississippi River and its distributaries. This firm mineral soil is underlain by semifluid mineral material. This soil is protected from most flooding by levees and is drained by

pumps. Areas range from 50 to 1,000 acres and are in urban uses. Slope is less than 0.5 percent.

In undisturbed areas, this soil typically has a surface layer of very dark gray, medium acid clay about 4 inches thick. The subsoil to a depth of about 20 inches is dark gray, very dark gray, and black, firm clay. Below that layer to a depth of about 32 inches is a buried surface layer of black, slightly acid clay. The underlying material to a depth of about 75 inches is gray and dark gray, semifluid clay. In places, logs and stumps are in the underlying material. In most areas that are developed for urban uses, this soil is covered with sandy or loamy material about 1 foot to 3 feet thick.

This Harahan soil has been drained by pumps and is protected from flooding by levees. Under normal conditions, the water table is maintained at a depth of about 1 foot to 3 feet below the surface. After heavy rains, the water table is near the surface for short periods. Flooding is rare, but it can occur during hurricanes or when water pumps or protection levees fail. Permeability is very slow. Water runs off the surface slowly. Available water capacity ranges from moderate to very high. This soil is high in fertility and moderate to very high in content of organic matter. This soil has a very high shrink-swell potential and a medium total subsidence potential.

Included in mapping are a few small areas of Sharkey soils in higher positions than the Harahan soil and Westwego soils in lower positions. The Sharkey soils are firm and clayey throughout. The Westwego soils contain buried layers of organic material. The included soils make up less than 10 percent of the map unit.

Most of the areas are developed for urban uses. Most areas are 25 to 75 percent covered by houses, streets, buildings, and parking lots; some areas are about 90 percent covered. The open areas are mostly lawns, vacant lots, and playgrounds. A small acreage is in pasture or is idle land.

This soil is poorly suited to urban uses and intensive forms of recreation. Flooding, wetness, very slow

Figure 2.—Water tupelo and baldcypress are the main trees growing in this area of Barbary muck.

permeability, subsidence, low strength, and the very high shrink-swell potential are the main limitations. If buildings are constructed, pilings and specially constructed foundations are needed. Additional support and stability for buildings and roads can be provided by adding sandy or loamy fill material to the soil surface. Adequate water control is needed to reduce wetness and to control the rate of subsidence. The effects of shrinking and swelling can be minimized by using proper engineering designs and by backfilling with mineral material that has a low shrink-swell potential. Shallow excavations are difficult to construct because of the buried stumps and logs in the soil and the semifluid nature of the underlying material. Septic tank absorption fields do not function properly because of wetness and the very slow permeability. If housing density is moderate to high, a community sewage system is needed.

This soil is well suited to pasture and moderately well suited to crops. However, few areas of this soil remain that have not been developed for urban uses. Suitable pasture plants are common bermudagrass, dallisgrass, tall fescue, and white clover. Fertility generally is sufficient for high quality, nonirrigated pasture. Water control is a major concern for crops and pasture.

This Harahan soil is in capability subclass IIIw.

4—Barbary muck. This level, very poorly drained, semifluid mineral soil is in swamps. It is flooded or ponded most of the time. Areas are 200 to 1,400 acres and parallel the natural levees. The number of observations made in these areas was fewer than in other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soil. Slope is less than 0.1 percent.

Typically, the surface layer is dark brown, slightly acid muck about 6 inches thick. The underlying material to a depth of about 66 inches is neutral and moderately alkaline, semifluid clay and mucky clay. Logs, stumps, and wood fragments are common throughout.

This Barbary soil is frequently flooded by freshwater for very long periods. The floodwater ranges in depth from 1 foot to 3 feet. During nonflood periods, the water table fluctuates between a depth of 1/2 foot below the soil surface and 1 foot above the surface. This soil has low strength and a very high shrink-swell potential. Permeability is very slow. The total subsidence potential is medium.

Included in mapping are a few large areas of Allemands, Larose, and Sharkey soils. The Allemands and Larose soils are in small areas of freshwater marsh that intrude into the swamp. The Sharkey soils are in higher positions and are poorly drained.

Natural vegetation on this Barbary soil consists of water-tolerant trees and aquatic understory plants. The common trees are baldcypress, black willow, and water tupelo (fig. 2). Understory and aquatic vegetation consists mainly of alligatorweed, butterweed, buttonbush, duckweed, pickerelweed, and water hyacinth.

Most areas of this soil are in woodland and are used as habitat for wetland wildlife habitat. The areas are also used for extensive recreation such as hunting. A small acreage is in crawfish ponds.

This soil is well suited to use as habitat for wetland wildlife. It provides habitat for large numbers of crawfish, ducks, squirrels, alligators, wading birds, and furbearers such as raccoon, mink, and otter. White-tailed deer, swamp rabbits, and turkey use areas of this soil when it is dry or not flooded too deeply. Trapping of alligators, crawfish, and furbearers is an important enterprise. Habitat management that encourages oaks and other mast-producing trees improves the habitat for wood ducks, squirrels, deer, and nongame birds. Constructing shallow ponds and artificially flooding this soil can improve the habitat for waterfowl.

This soil is poorly suited to woodland. Wetness, flooding, and poor trafficability are the main limitations. Few areas are managed for timber production because trees grow slowly and special equipment is needed to harvest the timber. This soil cannot support the load of most types of harvesting equipment.

Unless drained and protected from flooding, this soil is not suited to pasture or crops. Wetness and flooding are too severe for these uses. This soil generally is too soft and boggy to support livestock grazing.

This soil is not suited to urban uses. Wetness, low strength, and the very high shrink-swell potential are severe limitations, and flooding is a severe hazard. Drainage and protection from flooding are possible only by constructing large water control structures. Drainage ditches are difficult to construct because stumps and logs are buried in the soil. In addition, if this soil is drained, subsidence is a problem.

This Barbary soil is in capability subclass VIIw and woodland group 4w6.

6—Commerce silty clay loam. This level, somewhat poorly drained, firm mineral soil is in intermediate positions on the natural levees of the Mississippi River and its distributaries. Areas of this soil are long and narrow and range from 100 to 700 acres. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, slightly acid silty clay loam about 5 inches thick. The subsoil and underlying material to a depth of about 72 inches are grayish brown, neutral silty clay loam. In places, thin layers of clay are in the underlying material. In many places, this soil has been reworked to a shallow or moderate depth by urban construction activities.

This Commerce soil has high fertility. Permeability is moderately slow. Water runs off the surface at a slow rate and stands in low places for short periods after heavy rains. A high water table fluctuates between depths of 1 1/2 feet and 4 feet below the soil surface

from December through April. Available water capacity is very high. The shrink-swell potential is moderate.

Included in mapping are a few small areas of Commerce silt loam in slightly higher positions. The included areas make up less than 15 percent of this map unit.

Most of the acreage is in urban areas. A small acreage is in pasture, crops, or woodland. Most urban areas are 25 to 75 percent covered by houses, streets, buildings, and parking lots; some areas are 90 percent covered. The open areas are mostly lawns, vacant lots, playgrounds, or vegetable gardens.

This soil has moderate limitations for most urban uses. It is firm, consists of mineral materials throughout, and can support the foundations of most low structures without the use of pilings. Wetness and the moderate shrink-swell potential are the main limitations for dwellings without basements. These limitations can easily be overcome by installing a drainage system and by using proper engineering designs. The moderately slow permeability and the high water table increase the possibility of failure of septic tank absorption fields. If housing density is medium to high, a community sewage system is needed to prevent contamination of ground water sources. If the soil is used for local roads and streets, the limitation of low strength can be minimized by adding sand or other suitable fill material to the road base.

This soil is well suited to pasture. Suitable pasture plants are improved bermudagrass, dallisgrass, common bermudagrass, ryegrass, tall fescue, johnsongrass, southern wild winterpeas, white clover, vetch, and red clover. Grasses and legumes respond well to fertilizer. Lime is generally not needed. Use of proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and the soil in good condition.

This soil is well suited to cultivated crops. The main crop grown is vegetables, but sugarcane, soybeans, and corn are also suited. The surface layer is somewhat difficult to keep in good tilth. It is slightly sticky when wet and hard when dry. This soil can be worked only within a narrow range of moisture content. Wetness is a limitation. Land grading and smoothing and surface field ditches help to remove excess surface water. Proper management of crop residue and minimum tillage help improve tilth and reduce soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer.

This soil is well suited to woodland. The potential for hardwood trees is very high. Suitable trees are American sycamore, sweetgum, eastern cottonwood, green ash, and pecan.

This soil is moderately well suited to intensive recreation uses. Wetness is the main limitation. Excess surface water can be removed by providing the proper grade for the area and by constructing shallow ditches. Plant cover can be maintained by fertilizing and by controlling traffic.

This Commerce soil is in capability subclass IIw and woodland group 1w5.

7—Commerce and Sharkey soils, frequently flooded. These are level, poorly drained and somewhat poorly drained, firm mineral soils. The soils are on the unprotected river banks between the Mississippi River and the levees. They are subject to deep, frequent flooding as the river seasonally rises and falls. The soil pattern is irregular: some areas are all Sharkey soil, some areas are all Commerce soil, and other areas have both soils. The texture of the surface layer changes as the river reworks the deposits. The Commerce soil makes up about 50 percent of the map unit, and the Sharkey soil makes up about 30 percent. The mapped areas range from 10 to 200 acres in size. Slope is less than 1 percent.

Typically, the Commerce soil has a dark grayish brown, neutral silt loam or silty clay loam surface layer about 8 inches thick. The subsoil to a depth of about 30 inches is grayish brown, moderately alkaline silty clay loam. The underlying material to a depth of about 60 inches is grayish brown, moderately alkaline silt loam and silty clay loam.

Typically, the Sharkey soil has a dark gray, mildly alkaline clay surface layer about 9 inches thick. The subsoil to a depth of about 60 inches is gray, mottled, moderately alkaline clay.

Commerce and Sharkey soils are frequently flooded by overflow from the Mississippi River, mostly in spring. Depth of the floodwater ranges from 2 feet to 10 feet. During nonflood periods, the soils are wet and the water table is at the surface or within 2 feet of the surface. The soils have low to fair strength. The Commerce soil is moderately slowly permeable. It has a very high available water capacity and a moderate shrink-swell potential. The Sharkey soil is very slowly permeable. It has a high available water capacity and a very high shrink-swell potential. The content of organic matter is low to moderate.

Also mapped with these soils are a few small areas where mineral material has been added to raise the elevation above the high mark of flooding. These areas make up about 20 percent of the map unit.

Most of the acreage is idle or is used for recreation. A small acreage is in commercial uses.

This map unit is not suited to cultivated crops and is poorly suited to pasture because of deep, frequent flooding. Also, scouring and sedimentation are problems.

The Commerce soil is well suited to woodland, and the Sharkey soil is moderately well suited. Flooding and wetness limit the use of equipment on both soils. In addition, seedling mortality is severe on the Sharkey soil. Suitable trees to plant on the Commerce soil are eastern cottonwood and American sycamore. Eastern

cottonwood is a suitable tree to plant on the Sharkey soil. In dry years, machine planting is sometimes practical. Reforestation after harvesting must be carefully managed to reduce competition from undesirable plants.

This map unit is generally not suited to urban uses or intensive forms of recreation because of flooding, wetness, and the very high shrink-swell potential. If the soils are developed for commercial uses, sufficient fill material is needed to raise the surface elevation above normal flood levels.

The soils in this unit are well suited as habitat for wetland wildlife, woodland wildlife, and openland wildlife. The habitat for wildlife can be improved by maintaining undisturbed areas of permanent vegetation.

This map unit is in capability subclass Vw. The Commerce soil is in woodland group 1w5, and the Sharkey soil is in woodland group 3w6.

8—Kenner muck. This level, very poorly drained, semifluid organic soil is in freshwater marshes. It is flooded or ponded most of the time. Areas of this soil range from 200 to 2,000 acres. The number of observations made in these areas was fewer than in other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soil. Slope is less than 0.5 percent.

Typically, the surface layer is very dark gray, neutral muck about 12 inches thick. The underlying material to a depth of about 19 inches is gray, mildly alkaline, semifluid clay. To a depth of about 38 inches, it is very dark grayish brown and very dark gray, semifluid muck. To a depth of about 42 inches, it is dark gray, semifluid clay. To a depth of 99 inches or more, it is black, semifluid muck. In places, buried stumps and logs are in the underlying material.

The Kenner soil is almost continuously flooded by several inches of freshwater. During storms, floodwater is as deep as 2 feet. During nonflood periods, the seasonal high water table ranges from 1 foot above the surface to 1/2 foot below the surface. This soil has low strength and poor trafficability. Permeability is rapid in the organic layers and very slow in the clayey layers. The total subsidence potential is very high.

Included in mapping are a few large areas of Allemands and Larose soils. Also included are many small ponds and perennial streams. These areas make up about 15 percent of the map unit. The Allemands and Larose soils are on submerged natural levees along distributary channels. The Allemands soils do not have thin layers of semifluid clay in the upper part of the profile. The Larose soils are semifluid, clayey soils that have a thin organic surface layer.

Natural vegetation consists mainly of maidencane, cattail, alligatorweed, bulltongue, southern wildrice, pickerelweed, swamp knotweed, and common rush. Other less common plants are marshfern, common buttonbush, elephant ears, and water hyacinth.

Most of the acreage is used as habitat for wetland wildlife. Extensive forms of recreation are popular in the area. A small acreage is used for oil and gas fields.

This soil is well suited to extensive forms of recreation and to use as habitat for wetland wildlife. Food and roosting areas are available for ducks, geese, and other waterfowl. This soil also provides habitat for the American alligator and furbearers such as mink, otter, raccoon, and nutria. Fishing, hunting, and trapping are popular. The many waterways that have been constructed during gas and oil exploration provide access for hunters, fishermen, and trappers. Many species of freshwater fish are in the small ponds and perennial streams included in this map unit. Intrusion of saltwater is a problem in managing the vegetation for wetland wildlife. Water control structures, designed to improve the habitat for wildlife, are difficult to construct and maintain because of the instability of the organic material.

This soil is not suited to crops, woodland, or pasture. Wetness, flooding, and low strength are too severe for these uses. This soil is too soft and boggy to support livestock grazing.

This soil is not suited to urban and intensive recreation uses. Flooding, wetness, low strength, and subsidence potential are too severe for these uses. If this soil is drained and protected from flooding, it will subside 5 feet below sea level. The underlying clay layers have a very high shrink-swell potential.

This Kenner soil is in capability subclass VIIIw.

11—Kenner muck, drained. This level, poorly drained organic soil is in former freshwater marshes that have been drained and are protected from most floodwaters. Areas of this soil range from 2,000 to 8,000 acres and are mainly in urban uses. Elevation ranges from 1 foot to 6 feet below sea level. Slope is less than 0.5 percent.

In undisturbed areas, this soil typically has a surface layer of dark gray, very strongly acid muck about 3 inches thick. The layer below that to a depth of about 48 inches is black muck. The underlying material to a depth of about 96 inches is black and very dark grayish brown muck. It has a few thin layers of gray clay. In places, stumps and logs are in the underlying material.

In some of the areas that are in urban uses, the surface layer has been covered with 1 foot to 3 feet of sandy or loamy material. This soil shrinks and cracks in drying, and it remains cracked if rewetted.

This Kenner soil is drained by pumps and protected from flooding by levees. Under normal conditions, the water table is at a depth of about 2 to 4 feet below the surface. After high intensity rains of long duration, the water table is near the surface for short periods. Flooding is rare, but it can occur during hurricanes and when water pumps or protection levees fail. Permeability is rapid in the organic material and very slow in the mineral material. Although the surface has been covered

with mineral fill material, cracks in the surface layer remain open and extend into the underlying material. Water and air move freely through these cracks. Natural fertility is high. The content of organic matter is very high. Available water capacity is very high. The shrink-swell potential is low in the organic material and high in the mineral material. The total subsidence potential is high.

Included in mapping are a few small areas of Allemands muck, drained, and soils that are similar to Allemands muck, drained, except that they have a surface layer of muck about 5 to 15 inches thick. Both of these soils are in slightly higher positions than this Kenner soil. Also included are a few small areas of Kenner muck, drained, that have severely subsided and have a water table at the surface most of the time. The included areas make up about 15 percent of this map unit.

Most of the acreage is in urban uses. Most areas are 25 to 75 percent covered by houses, streets, buildings, and parking lots; some areas are about 90 percent covered. The open areas are mostly lawns, vacant lots, playgrounds, and vegetable gardens. A small acreage is in pasture or idle land that is reserved for future urban uses.

This soil is poorly suited to most urban uses or intensive forms of recreation. Flooding, wetness, subsidence, and low strength are the main limitations. When the water table is lowered, the organic matter oxidizes and slowly subsides. In places, buried stumps and logs cause uneven subsidence. If dry, the organic material is subject to burning.

If this soil is used for buildings, pilings and specially constructed foundations are needed. Additional support and stability for buildings and roads can be provided by adding sandy or loamy fill material to the soil surface. Adequate water control is needed to reduce wetness and to control the rate of subsidence. Drainage ditches and other shallow excavations are difficult to construct and maintain because of the buried stumps and logs in the soil, the semifluid nature of the underlying material, and the continuing subsidence. Septic tank absorption fields do not function properly in this soil because of wetness. If housing density is moderate to high, a community sewage system is needed. Soil acidity limits the choice of ornamental trees and other plants used in landscaping.

This soil is moderately well suited to crops and pasture. However, few areas remain that are not in urban uses. Wetness is the main limitation. Adequate water control is needed. Suitable pasture plants are common bermudagrass, dallisgrass, tall fescue, ryegrass, and white clover.

This Kenner soil is in capability subclass IVw.

13—Sharkey clay. This poorly drained, firm mineral soil is in low positions on the natural levees of the Mississippi River and its distributaries. Most areas range from 200 to 3,000 acres and are developed for urban uses. Slope is less than 1 percent.

Typically, the surface layer is dark gray or very dark grayish brown, strongly acid clay about 4 inches thick. The subsoil and underlying material to a depth of about 60 inches are dark gray, mottled, neutral and moderately alkaline, firm clay.

This Sharkey soil is very slowly permeable. Water runs off the surface at a slow rate and stands in low places for short periods after heavy rains. Flooding is rare, but it can occur after heavy rains of long duration. Under natural conditions, the high water table fluctuates between the surface and a depth of 2 feet below the surface from December to April. In most places this soil has been drained, and the water table is controlled with pumps. The shrink-swell potential is very high. Deep cracks form during prolonged periods of dry weather; the cracks close when the soil is wet. Available water capacity is high. The content of organic matter is low to moderate, and fertility is high.

Included in mapping are a few small areas of Harahan soils. The Harahan soils are in slightly lower positions than the Sharkey soil and have a semifluid, mineral underlying material. They make up less than 15 percent of the map unit.

Most of the acreage is in urban uses. Most urban land areas are 25 to 75 percent covered by buildings, streets, and parking lots; some areas are about 90 percent covered. The open areas are mostly lawns, vacant lots, playgrounds, and vegetable gardens. A small acreage is in pasture, crops, or woodland.

This soil is poorly suited to urban uses or intensive recreation areas. However, this firm, mineral soil can support the foundations of most low structures without the use of piling. Wetness, the very slow permeability, and the very high shrink-swell potential are the main limitations. Drainage is needed for most urban uses. Buildings and roads need to be constructed to offset the shrinking and swelling and the limited ability of the soil to support a load. Septic tank absorption fields do not function properly because of wetness and the very slow permeability. If housing density is moderate to high, a community sewage system is needed. If this soil is used for playgrounds or other intensive recreation, adding sandy or loamy material to the surface reduces wetness and stickiness of the surface layer.

This soil is well suited to pasture. Suitable pasture plants are bahiagrass, common bermudagrass, dallisgrass, ryegrass, southern wild winterpeas, tall fescue, vetch, red clover, and white clover. When seedbeds are prepared, poor tilth is a problem because the clayey surface layer tends to be sticky. Nitrogen fertilizer is needed for optimum growth of grasses and legumes. Lime generally is not needed for grasses. Proper stocking rates, pasture rotation, and restricted

grazing during wet periods help to keep the pasture in good condition.

This soil is well suited to woodland. It has high potential for the production of bottom land hardwoods. The main suitable trees include American sycamore, cherrybark oak, eastern cottonwood, green ash, pecan, and sweetgum. Seedling mortality is moderate. Unless drainage is provided, wetness limits the use of equipment. When wet, the surface layer of this soil remains sticky for long periods, and trafficability is poor.

This soil is moderately well suited to cultivated crops. The main crop grown is vegetables, but sugarcane, soybeans, grain sorghum, and rice are also suited. The plow layer of this soil is sticky when wet and hard when dry; it becomes very cloddy if worked when too wet or too dry. This soil is difficult to keep in good tilth. Wetness delays tillage operations in most years. A drainage system is needed for most crops. Surface field ditches and land grading or smoothing help remove excess surface water. Returning crop residue to the soil helps to increase the content of organic matter, improve soil tilth, and reduce soil losses from erosion. Most crops, other than legumes, respond well to nitrogen fertilizer. Lime is generally not needed. Irrigation is needed for rice.

This Sharkey soil is in capability subclass IIIw and woodland group 2w6.

14—Sharkey silty clay loam. This level, poorly drained, firm mineral soil is in low and intermediate positions on the natural levees of the Mississippi River and its distributaries. Areas are irregular and range from 10 to 500 acres. Most areas are in urban uses. Slope is less than 1 percent.

Typically, the surface layer is dark grayish brown, neutral silty clay loam about 5 inches thick. The subsoil and underlying material to a depth of about 60 inches are gray, firm, neutral and moderately alkaline clay.

This soil is very slowly permeable. Water runs off the surface slowly and stands in low places for short periods after heavy rains. Flooding is rare, but it can occur after heavy rains of long duration. From December through April, under natural conditions, the high water table fluctuates between the surface and 2 feet below the surface. However, in most places, the soil is drained, and pumps control the depth of the water table. The surface layer is wet for long periods in winter and spring. This soil dries out more slowly than most of the adjoining soils in higher positions. This soil has a very high shrink-swell potential. It cracks when dry and seals over when wet. The available water capacity is high. The content of organic matter is low to moderate. Natural fertility is high.

Included in mapping are a few small areas of Sharkey clay and Harahan soils in slightly lower positions than this Sharkey soil. The Harahan soils have a semifluid, clayey underlying material. The included soils make up less than 15 percent of the map unit.

Most of the acreage is in urban uses. About 25 to 75 percent of most urban areas is covered by buildings, streets, and parking lots; some areas are about 90 percent covered. The open areas are mostly lawns, playgrounds, vacant lots, and vegetable gardens. A small acreage is in pasture, woodland, or crops.

This soil is poorly suited to urban uses or intensive forms of recreation. However, it is firm, has mineral material throughout, and can support the foundations of most low structures without the use of piling. Wetness, very slow permeability, and the very high shrink-swell potential are the main limitations. Drainage is needed for buildings and roads. In addition, buildings and roads should be constructed to offset the effects of shrinking and swelling and the limited ability of the soil to support a load. Septic tank absorption fields do not function properly because of wetness and the very slow permeability. If housing density is moderate to high, a community sewage system is needed. Providing drainage and adding sandy or loamy material to the surface improves this soil for use as playgrounds and other intensive recreation uses.

This soil is well suited to use as pasture. Suitable pasture plants include common bermudagrass, dallisgrass, bahiagrass, ryegrass, johnsongrass, southern wild winterpeas, tall fescue, vetch, red clover, and white clover. Nitrogen fertilizer is needed for optimum growth of grasses and legumes. Lime generally is not needed for grasses. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and the soil in good condition.

This soil is moderately well suited to cultivated crops. Vegetables are the main crop, but corn, grain sorghum, rice, sugarcane, and soybeans are also suited. The plow layer of this soil is slightly sticky when wet and hard when dry; it becomes somewhat cloddy if worked when too wet or too dry. Wetness delays tillage operations in most years. A drainage system is needed for most crops. Surface field ditches and land grading or smoothing help remove excess surface water. Returning crop residue to the soil helps maintain the content of organic matter, improve tilth, and reduce soil losses from erosion. Most crops, other than legumes, respond well to nitrogen fertilizer. Lime is generally not needed. Irrigation is necessary for rice.

This soil is well suited to use as woodland. The potential for the production of bottom land hardwoods is high. Suitable trees are American sycamore, cherrybark oak, eastern cottonwood, green ash, pecan, and sweetgum. Seedling mortality is moderate. Unless drainage is provided, wetness limits the use of equipment.

This Sharkey soil is in capability subclass IIIw and woodland group 2w6.

16—Vacherie silt loam, gently undulating. This somewhat poorly drained, firm mineral soil is in

intermediate positions on the natural levees of the Mississippi River and its distributaries. Areas range from 15 to 500 acres. Most of these areas are in urban uses. Slopes range from 0 to 3 percent.

Typically, the surface layer is dark grayish brown silt loam about 9 inches thick. It is slightly acid in the upper part and mildly alkaline in the lower part. The subsoil to a depth of about 28 inches is grayish brown, mottled silt loam. It is mildly alkaline in the upper part and moderately alkaline in the lower part. The underlying material to a depth of about 60 inches is dark gray and gray, moderately alkaline clay and silty clay. In places, the clayey underlying material is at a depth of 10 to 20 inches.

This soil has high fertility. Permeability is moderate in the loamy upper part of the profile and very slow in the clayey lower part. Water runs off the surface at a slow rate. The surface layer and subsoil are wet for long periods in winter and spring. A high water table fluctuates between depths of 1 foot and 3 feet below the soil surface from December through April. The available water capacity is moderate to high. The content of organic matter is low to moderate.

Included in mapping are a few small areas of Commerce soils. The Commerce soils are in similar positions and are loamy throughout. They make up about 15 percent of the map unit.

Most of the acreage is in urban uses. About 25 to 75 percent of most urban areas is covered by buildings, streets, and parking lots. The open areas are mostly lawns, vacant lots, playgrounds, and vegetable gardens. A small acreage is in pasture, crops, or woodland.

This soil has severe limitations for most urban uses. However, it is firm, has mineral material throughout, and can support the foundations of most low structures without the use of pilings. The main limitations are wetness, the very high shrink-swell potential, low strength, and very slow permeability. Excess surface water can be removed by using shallow ditches and by grading. The effects of shrinking and swelling can be minimized by using proper design and construction. The high water table and the very slow permeability in the underlying material increase the possibility of failure of septic tank absorption fields. If housing density is moderate to high, a community sewage system is needed. If this soil is used for local roads and streets, adding sand or other suitable fill material to the road base can help improve the bearing strength.

This soil is poorly suited to intensive recreation uses such as playgrounds. Wetness and the very slow permeability are the main limitations. Shallow ditches and land smoothing or grading help to remove excess surface water. Plant cover can be maintained by fertilizing and controlling traffic.

This soil is well suited to pasture. The main suitable pasture plants are common bermudagrass, improved bermudagrass, dallisgrass, bahiagrass, johnsongrass, tall fescue, white clover, vetch, red clover, and southern wild winterpeas. Shallow ditches help remove excess surface water. Proper grazing practices, weed control, and fertilizer are needed for maximum quality of forage. Lime is generally not needed for grasses.

This soil is well suited to cultivated crops. The main crop grown is vegetables, but sugarcane, soybeans, corn, and small grain are also suited. This soil is friable and easy to keep in good tilth. A traffic pan develops easily, but it can be broken up by chiseling or deep plowing. Wetness is the main limitation. Proper row arrangement, surface field ditches, and grassed outlets can help to remove excess surface water. Land smoothing will improve surface drainage; however, deep cutting may expose the clayey underlying material. Minimum tillage and leaving crop residue on the soil or adding other organic matter improve fertility and help maintain soil tilth and the content of organic matter. Crops respond well to fertilizer. Lime is generally not needed.

This soil is well suited to woodland. The potential for hardwood trees is very high. Suitable trees are green ash, eastern cottonwood, sweetgum, American sycamore, and pecan. This soil has few limitations to use and management.

This Vacherie soil is in capability subclass IIw and woodland group 1w5.

17—Commerce silt loam. This level, somewhat poorly drained, firm mineral soil is in high positions on the natural levees of the Mississippi River and its distributaries. Areas of this soil are long and narrow and range from 200 to 3,000 acres. Most of these areas are in urban uses. Slope is less than 1 percent.

Typically, the surface layer is very dark grayish brown, neutral silt loam about 4 inches thick. The subsoil is grayish brown, mildly alkaline silt loam in the upper part and dark grayish brown, moderately alkaline silt loam in the lower part. The underlying material to a depth of about 60 inches is grayish brown, mottled, moderately alkaline loam and silty clay loam. In places, thin layers of clay are in the underlying material. In most places, this soil has been reworked by urban construction activities.

This Commerce soil has high fertility. Permeability is moderately slow. Water runs off the surface at a slow rate. A high water table fluctuates between depths of 1 1/2 and 4 feet from December through April. The available water capacity is very high. This soil has a moderate shrink-swell potential.

Included in mapping are a few small areas of Commerce silty clay loam in slightly lower positions. This soil makes up less than 10 percent of the map unit.

Most of the acreage is in urban uses. Most urban areas are 25 to 75 percent covered by houses, streets, buildings, and parking lots; some areas are about 90 percent covered. The open areas are mostly lawns,

vacant lots, playgrounds, and vegetable gardens. A small acreage is in pasture, crops, or woodland.

This soil has moderate limitations for most urban uses. However, it is firm, has mineral material throughout, and can support the foundations of most low structures without the use of piling. Wetness and moderate shrink-swell potential are the main limitations for dwellings without basements. Excess surface water can be removed by using shallow ditches and by grading the area. The effects of shrinking and swelling can be minimized by proper construction. The moderately slow permeability and the high water table increase the possibility of failure of septic tank absorption fields. These limitations can be overcome by providing drainage and by increasing the size of the absorption field. If the density of housing is moderate, community sewage systems are needed. If this soil is used for local roads and streets, low strength is a limitation. Adding sand or other suitable fill material to the road base can help to overcome this limitation.

This soil is moderately well suited to intensive recreation uses. Wetness is the main limitation. Shallow ditches and land smoothing or grading can help to remove excess surface water. Plant cover can be maintained by fertilizing and by controlling traffic.

This soil is well suited to pasture. Suitable pasture plants are common bermudagrass, improved bermudagrass, bahiagrass, johnsongrass, dallisgrass, tall fescue, white clover, vetch, red clover, and southern wild winterpeas. Proper grazing practices, weed control, and fertilizer are needed for maximum quality of forage.

This soil is well suited to cultivated crops. The main crop grown is vegetables, but sugarcane, soybeans, corn, and small grains are also suited. This soil is friable and is easy to keep in good tilth. A traffic pan develops easily, but it can be broken up by chiseling or deep plowing. Wetness is the main limitation. Proper row arrangement, surface field ditches, and grassed outlets help to remove excess surface water. Land grading or smoothing also improves surface drainage. Proper management of crop residue helps to maintain tilth and reduces soil losses from erosion. Most crops other than legumes respond well to nitrogen fertilizer.

This soil is well suited to woodland. The potential for hardwood trees is very high. Suitable trees are American sycamore, water oak, eastern cottonwood, green ash, and pecan.

This Commerce soil is in capability subclass IIw and woodland group 1w5.

18—Larose muck. This level, very poorly drained, semifluid mineral soil is in freshwater marshes. It is flooded or ponded most of the time. Areas of this soil range from about 20 to 200 acres. The number of observations made in these areas was fewer than in other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soil. Slope is less than 0.2 percent.

Typically, the surface layer is very dark brown, medium acid muck about 4 inches thick. The underlying material to a depth of about 76 inches is gray, dark gray, and very dark grayish brown, semifluid clay and mucky clay. In places, a few stumps and logs are buried in the underlying material.

This soil is almost continuously flooded. During storms, floodwater is as deep as 4 feet. During nonflood periods, the water table ranges from 3 feet above the surface to 1/2 foot below the surface. This soil has low strength. It is saturated with water and semifluid throughout. This soil has a medium total subsidence potential and a very high shrink-swell potential. Permeability is very slow.

Included in mapping are a few large areas of Allemands and Barbary soils. Allemands soils are in positions similar to those of this Larose soil and have a thick organic surface layer. Barbary soils are in swamps and have many buried logs and stumps throughout. Also included are many small ponds and perennial streams. The included soils make up less than 15 percent of the map unit.

The natural vegetation is mainly alligatorweed, common rush, maidencane, swamp knotweed, pickerelweed, bulltongue, cattail, and southern wildrice.

Most of the acreage of this soil is used as habitat for wetland wildlife and for extensive forms of recreation. There are oil and gas wells in some areas.

This soil is well suited to use as habitat for wetland wildlife. It provides habitat for large numbers of ducks and other species of waterfowl. It also provides habitat for crawfish, alligators, swamp rabbits, deer, nutria, mink, otter, and raccoon. The small ponds and perennial streams have many species of freshwater fish. Sport fishing and duck hunting are also popular. Intensive habitat management is difficult. Water control structures are difficult to construct because of the instability and semifluid nature of the soil.

This soil is not suited to crops, trees, or pasture because of wetness and flooding. This soil is generally too soft and boggy to support livestock.

This soil is not suited to urban uses or intensive recreation uses because of flooding, wetness, subsidence, and low strength. The soil material is poorly suited to the construction of levees. Upon drying, it shrinks and cracks considerably, and levees constructed of this soil fail.

This Larose soil is in capability subclass VIIw.

20—Westwego clay. This level, poorly drained mineral soil is in former swamps that have been drained and are protected from flooding. Areas of this soil range from 50 to 800 acres. Slope is less than 0.5 percent.

If undisturbed, typically, this soil has a surface layer of very dark gray, medium acid clay about 3 inches thick. The subsoil to a depth of about 21 inches is mainly dark

gray, mottled, firm clay that has a thin layer of black mucky clay. Below that, there is black muck to a depth of about 36 inches. The subsoil has shrunk and cracked, and it remains cracked when rewetted. The underlying material to a depth of about 68 inches is dark gray, mottled, semifluid clay. Below that to a depth of about 80 inches is stratified dark gray, semifluid clay and very dark brown, semifluid mucky clay. In places, many logs and stumps are buried in the underlying material. In many of the areas developed for urban uses, the surface layer has been covered with loamy or sandy material.

This Westwego soil has been drained by pumps and is protected from flooding by levees. Under normal conditions, the water table is maintained at a depth of about 1 foot to 3 feet below the surface. After heavy rains, the water table may be near the surface for short periods. In places where the soil has subsided, the water table is near the surface most of the time. Flooding is rare, but it occurs during hurricanes and when water pumps or protection levees fail. Permeability is very slow in the soil material, but water flows rapidly through the network of cracks. Even if the cracks in the surface layer are covered by fill material, the cracks in the subsoil remain open. Water and air move freely through these cracks. The available water capacity is moderate to very high. The total subsidence potential is medium to high. The shrink-swell potential is very high.

Included in mapping are a few small areas of Harahan soils. The Harahan soils are in slightly higher positions and are clayey throughout. They make up less than 10 percent of the map unit.

Most of the acreage has been developed for commercial and residential uses. Most areas are 25 to 75 percent covered by buildings, streets, and parking lots; some areas are about 90 percent covered. The open areas are mostly lawns, vacant lots, and playgrounds. A small acreage is in pasture or idle land that is reserved for future urban uses.

This soil is poorly suited to urban uses or intensive recreation uses. Flooding, wetness, subsidence, low strength, and the very high shrink-swell potential are the main limitations. In places, buried stumps and logs cause uneven subsidence.

If this soil is used for dwelling sites, pilings and specially constructed foundations are needed. Adding sandy or loamy fill material to the surface reduces wetness and improves the load-supporting capacity of the soil for buildings and local roads and streets. The effects of shrinking and swelling can be minimized by using proper engineering designs for buildings and roads. In places, buried logs and stumps cause uneven subsidence of the soil (fig. 3). Septic tank absorption fields do not function properly in this soil because of wetness, the very slow permeability, and the cracks in the soil. Community sewage systems are needed to prevent contamination of water supplies by seepage through the cracks. Adequate water control is needed to reduce wetness and control the rate of subsidence. Drainage ditches and levees are difficult to construct and maintain because when the soil dries, the semifluid mineral and organic materials subside and crack.

This soil is well suited to woodland and pasture and moderately well suited to crops. However, few areas remain that are not in urban uses. Suitable pasture plants are bahiagrass, common bermudagrass, Coastal bermudagrass, dallisgrass, tall fescue, and white clover. Maintaining adequate water control is the main concern. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture and the soil in good condition.

This Westwego soil is in capability subclass IVw.

22—Scatlake muck. This level, very poorly drained, semifluid mineral soil is in saline marshes that are flooded or ponded most of the time. Areas are long and narrow and range from about 200 to 3,000 acres. The areas generally parallel natural waterways. Fewer observations were made in mapping this soil than in mapping other soils because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soil. Slope is less than 0.5 percent.

Typically, the surface layer is very dark gray, moderately alkaline muck about 6 inches thick. Below that layer to a depth of about 14 inches there is dark gray, moderately alkaline, semifluid clay. The underlying material to a depth of about 66 inches is dark gray and gray, moderately alkaline, semifluid clay.

This Scatlake soil is flooded with about 1 foot of saltwater most of the time. During storms, tides from the Gulf of Mexico cover this soil with 2 to 3 feet of water. During nonflood periods, the water table ranges from 1 foot above the soil surface to 1/2 foot below the surface. This soil has low strength and poor trafficability. It is continuously saturated and semifluid. The shrink-swell potential is very high. Permeability is very slow. The total subsidence potential is medium.

Included in mapping are a few large areas of Timbalier soils. Also included are many small ponds and perennial streams. The Timbalier soils have a thick organic surface layer and are in deep basins between the natural waterways. The included soils make up less than 5 percent of the map unit.

The natural vegetation is mainly marshhay cordgrass, needlegrass rush, seashore shortgrass, smooth cordgrass, bushy sea-oxeye, saltwort, and Virginia samphire.

Most of the acreage is used as habitat for wetland wildlife and for extensive recreation. A small acreage is used for oil and gas wells.

This soil is well suited to use as habitat for wetland wildlife. It provides habitat for moderate populations of geese, muskrat, mink, otter, and raccoon. This soil is

part of an estuary that provides a nursery for saltwater fish and crustaceans such as shrimp, blue crab, menhaden, croaker, spot, and bay anchovy. These fish and estuarine larval forms are sources for a large fishing industry. The many natural ponds and waterways provide access for fishing, shrimping, and hunting.

This soil is not suited to crops, trees, or pasture because of wetness, flooding, salinity, low strength, and poor accessibility. This soil cannot support the weight of farm machinery or cattle.

This soil is not suited to urban uses or to intensive recreation because of flooding, wetness, the very high shrink-swell potential, and low strength. In addition, hurricanes are common. If this soil has been drained and is protected from flooding, it shrinks, cracks, and subsides to elevations below sea level.

This Scatlake soil is in capability subclass VIIw.

23—Felicity loamy fine sand, occasionally flooded. This gently undulating, somewhat poorly drained, saline sandy soil is on ridges along the coast of the Gulf of Mexico. This soil is subject to flooding by saltwater during high storm tides. Areas are long and narrow and about 500 acres in size. Elevation ranges from 3 to 5 feet above sea level. Slopes range from 0 to 3 percent.

Typically, the surface layer is brown, moderately alkaline loamy fine sand about 5 inches thick. The layer below that to a depth of about 38 inches is brown, mottled, moderately alkaline loamy fine sand. The underlying material to a depth of about 60 inches is

Figure 3.—Buried logs and stumps resulted in uneven subsidence The soil is Westwego clay. It is poorly suited to use as homesites.

black, moderately alkaline loamy fine sand. Fragments of shells are in all layers.

This Felicity soil is saline and has low fertility. Permeability is rapid. The water table fluctuates with the normal tides and is within 2 feet of the soil surface almost daily. This soil is occasionally flooded by saltwater from the Gulf of Mexico during storms. The content of organic matter is very low. Water runs off the surface slowly. Available water capacity is very low.

Included in this map unit are a few small areas of Scatlake and Timbalier soils. Both the semifluid, clayey Scatlake soils and the organic Timbalier soils are in lower positions. The included soils make up less than 5 percent of the map unit.

The natural vegetation is mainly black-mangrove, bigleaf sumpweed, bitter panicum, seashore saltgrass, saltwort, and smooth cordgrass. Less common plants are beach morningglory, bushy sea-oxeye, marshhay cordgrass, and needlegrass rush. Some areas are barren of vegetation.

Most of the acreage is used for extensive recreation or is in commercial and residential uses (fig. 4). On Grand Isle, a large area of this soil is developed as a seashore resort. A small acreage is in native vegetation and is used as habitat for wildlife.

This soil is very poorly suited to use as habitat for wetland wildlife. The soil provides little plant growth for food, and it is used mainly as a resting area by ducks, geese, and shore birds.

This soil has severe limitations to urban uses. Flooding and wetness are the main limitations. Occasional hurricanes and high storm tides are severe hazards. Soil salinity and droughtiness are limitations where lawn grasses are planted. This soil is poorly suited to intensive recreation uses.

This soil is not suited to crops and is poorly suited to pasture mainly because of flooding, wetness, and salinity.

This Felicity soil is in capability subclass VIs.

24—Timbalier-Scatlake association. These level, very poorly drained, semifluid organic and mineral soils are in saline marshes. They are flooded or ponded most of the time. Areas are 500 acres or more. The map unit consists of about 65 percent Timbalier soils and about 25 percent Scatlake soils. The Timbalier soils are in broad basins and the Scatlake soils are in positions near natural waterways. The number of observations made in mapping these areas was fewer than in other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soils. Slope is less than 0.5 percent.

Typically, the Timbalier soils to a depth of about 66 inches are very dark grayish brown, moderately alkaline,

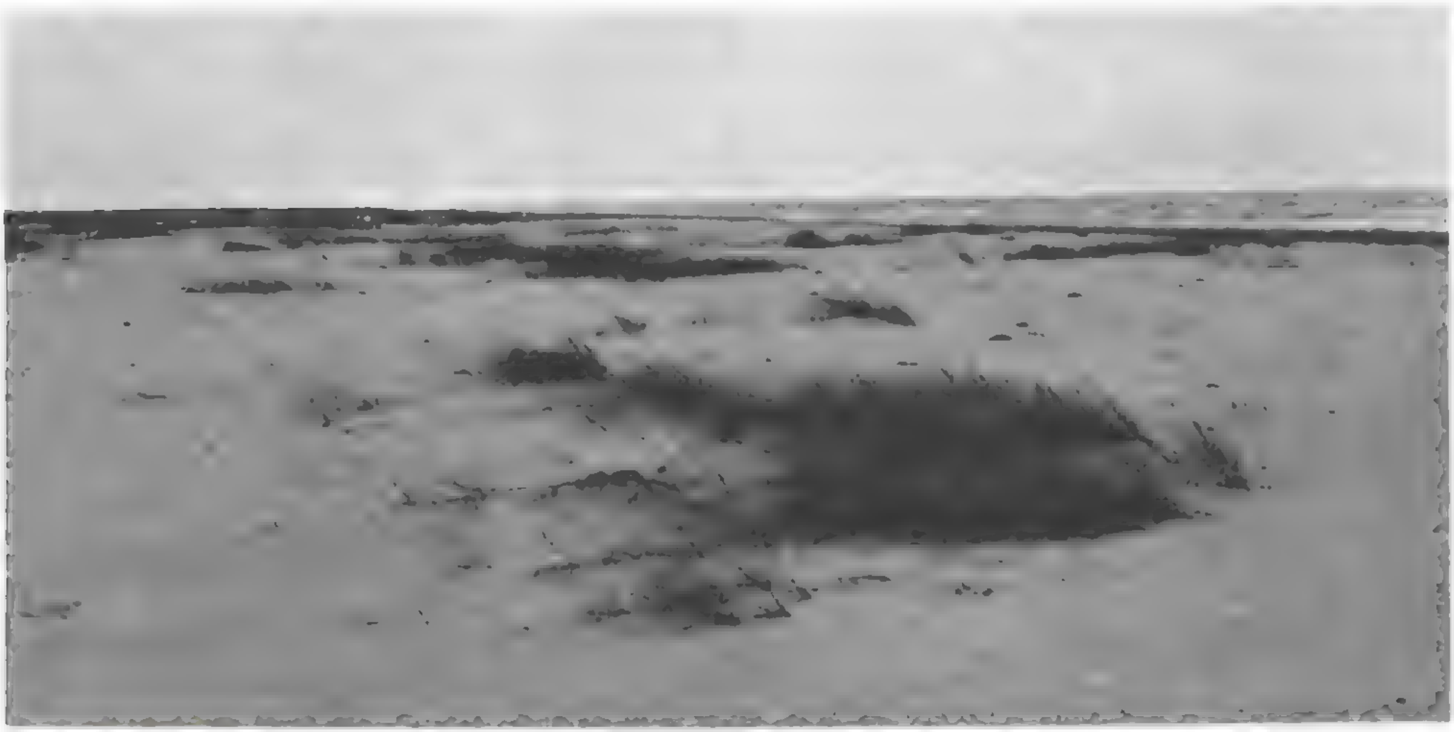


Figure 4.—This area of Felicity loamy fine sand, occasionally flooded, provides a good beach for recreation along the Gulf of Mexico.

semifluid muck. The underlying material to a depth of about 72 inches is gray, moderately alkaline, semifluid clay. In places, the thickness of the organic upper part of the soil ranges from 16 to 50 inches.

Typically, the Scatlake soils are very dark grayish brown, moderately alkaline, semifluid muck in the upper 5 inches. Below that layer to a depth of about 8 inches is dark gray, moderately alkaline, semifluid clay. The underlying material to a depth of about 60 inches is gray and dark gray moderately alkaline, semifluid clay. In places, this soil has thin strata of muck in the underlying material.

The Timbalier and Scatlake soils are almost continuously flooded by 12 inches of saltwater. During storms, they are covered by as much as 3 feet of saltwater. During nonflood periods, the water table ranges from 1 foot above the surface to 1/2 foot below the surface. These soils are soft and boggy and have low strength. Permeability is rapid in the organic material and very slow in the clayey underlying material. The Timbalier soils have a very high total subsidence potential. The Scatlake soils have a medium total subsidence potential.

The soils of minor extent in this association are a few areas of Felicity soils about 20 to 80 acres in size and many small ponds and perennial streams. The Felicity soils are on low ridges and are sandy throughout. These soils make up about 10 percent of the map unit.

The natural vegetation is mainly bushy sea-oxeye, marshhay cordgrass, needlegrass rush, saltwort, seashore saltgrass, smooth cordgrass, and Virginia samphire.

Most of the acreage is used as habitat for wetland wildlife and extensive recreation. A small acreage is used for oil and gas wells.

These soils are well suited as habitat for wetland wildlife. The map unit is in the estuarine complex that contributes to the support of marine life in the Gulf of Mexico. Saltwater fish and the young of crustaceans such as shrimp, blue crab, menhaden, croaker, spot, and bay anchovy use these areas as part of their nursery grounds. These fish and estuarine larval forms are sources for a major fishing and shrimping industry. The soils also provide habitat for moderate numbers of geese, muskrat, mink, otter, and raccoon and some alligators, ducks, nutria, and swamp rabbits. Sport fishing and hunting are popular.

These soils are not suited to crops, woodland, pasture, or urban uses. The limitations of flooding and wetness are too severe for these uses. These soils are too soft and boggy to support livestock grazing. If these soils have been drained and are protected from flooding, they shrink, crack, and subside. The soil materials are poorly suited to use as construction materials because of the high content of organic matter and the semifluid nature of the material. Hurricanes and other severe storms strike areas of this association occasionally.

These Timbalier and Scatlake soils are in capability subclass VIIIw.

25—Lafitte-Clovelly association. These level, very poorly drained, saline, semifluid organic soils are in brackish marshes. They are flooded or ponded most of the time. The landscape is a broad, flat marsh that has many low natural levees of distributary channels and many small ponds and perennial streams. These natural levees have subsided below sea level. Lafitte soils are in the deep interlevee basins and Clovelly soils are on the low natural levees along waterways. The Lafitte soils make up about 68 percent of the map unit, and the Clovelly soils make up about 32 percent. Areas of this unit range from 200 to 8,000 acres or more. The number of observations made in these areas was fewer than in other areas because of poor accessibility. The detail in mapping, however, is adequate for the expected use of the soils. Slope is less than 0.2 percent.

Typically, the Lafitte soil is dark brown and black, mildly alkaline and moderately alkaline muck to a depth of about 56 inches. The underlying material to a depth of about 84 inches is dark gray and gray, moderately alkaline, semifluid clay and silty clay loam.

Typically, the Clovelly soil is very dark grayish brown and black, moderately alkaline muck to a depth of about 40 inches. The underlying material to a depth of about 84 inches is a gray and dark gray, moderately alkaline, semifluid clay. In places, the mucky upper part of the soil is only 10 to 16 inches thick.

The Lafitte and Clovelly soils are almost continuously flooded by about 1 foot of saline water. During storms, they are covered by as much as 3 feet of water. During nonflood periods, the water table ranges from 1 foot above the surface to 1/2 foot below the surface. These soils are saturated with water and semifluid throughout. They have low strength and poor trafficability. The underlying clayey material has a very high shrink-swell potential. Permeability is rapid in the organic layers and very slow in the clayey layers. The total subsidence potential is high.

The natural vegetation consists mainly of marshhay cordgrass, coastal waterhyssop, dwarf spikerush, Olney bulrush, and saltmarsh morningglory.

Most of the acreage is used as habitat for wetland wildlife and for extensive recreation uses. A small acreage is used for oil and gas wells.

The soils are well suited to use as habitat for wetland wildlife. They provide habitat for large numbers of geese and furbearers such as mink, muskrat, otter, and raccoon. Intensive management of wildlife habitat generally is not practical. Water control structures are difficult to construct and maintain because of the instability and semifluid nature of the soil material. Saltwater intrusion is a problem in the management of the vegetation for wildlife habitat. The small ponds and streams included in this map unit provide areas for sport

and commercial fishing. Hunting of geese is also popular.

The soils are not suited to crops or pasture or to use as woodland because of wetness, flooding, salinity, low strength, and poor accessibility. These soils are generally too soft and boggy to support livestock.

The soils are not suited to urban or intensive recreation uses because of flooding and wetness.

The Lafitte soil is in capability subclass VIIIw, and the Clovelly soil is in capability subclass VIIw.

Prime farmland

Prime farmland is one of several kinds of important farmland defined by the U.S. Department of Agriculture. It is of major importance in providing the nation's short- and long-range needs for food and fiber. The supply of high quality farmland is limited, and the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, must encourage and facilitate the wise use of the nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is the land that is best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture content needed to economically produce high yields of crops. It needs only to be treated and managed using acceptable farming methods. Prime farmland produces the highest yields with minimal inputs of energy and economic resources, and farming it results in the least damage to the environment.

Prime farmland does not include urban or built-up land or water areas. Prime farmland soils may presently be used for crops, pasture or as woodland, or they may be in other uses. They either are used for producing food or fiber or are available for those uses.

Prime farmland soils usually get an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and length of the growing season are favorable. The acidity or alkalinity level of the soils is acceptable. The soils have few or no rocks and are permeable to water and air. Prime farmland soils are not excessively erodible or saturated with water for long periods and generally are not flooded during the growing season. The slopes range mainly from 0 to 6 percent.

Soils that have a seasonal high water table, are subject to flooding, or are droughty may qualify as prime farmland soils if the limitations or hazards are overcome by drainage, flood control, or other practices. Onsite evaluation is necessary to determine the effectiveness of corrective measures. For more detailed information on the criteria for prime farmland consult the local Soil Conservation Service office.

Only a few hundred acres in Jefferson Parish meet the requirements for prime farmland. Areas are mainly on the natural levees along the Mississippi River and its distributaries. Most of this acreage is used for vegetable crops.

The trend in land use in Jefferson Parish has been the conversion of prime farmland to urban and related uses. It is likely that, in a few years, all of the prime farmland in the parish will be converted to urban uses.

The following map units make up prime farmland in Jefferson Parish. The location of each map unit is shown on the detailed soil maps in the back of this publication. The extent of each map unit is shown in table 4. The soil qualities that affect use and management are described in the section "Detailed soil map units." This list does not constitute a recommendation for a particular land use.

6 Commerce silty clay loam
13 Sharkey clay
14 Sharkey silty clay loam
16 Vacherie silt loam, gently undulating
17 Commerce silt loam

Some areas of the prime farmland soils in Jefferson Parish are urban or built-up land, which is defined as any contiguous unit of land 10 acres or more in size that is used for nonfarm uses including housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water control structures.

Use and management of the soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops, pasture, and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of roadfill and topsoil. They can use it to identify areas where wetness, semifluid soil layers, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and pasture

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained, and the estimated yields of the main hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed soil map units." Specific information can be obtained from the staff at the local office of the Soil Conservation Service, the Cooperative Extension Service, or the Louisiana Agricultural Experiment Station.

Less than 5,600 acres in Jefferson Parish was used for pasture and crops, according to 1979 estimates made by the Soil Conservation Service. There has been a gradual decrease in pasture and woodland acreage and an increase in the acreage in urban use.

Although few crops are grown, the climate and some of the soils in Jefferson Parish are well suited to all crops commonly grown in nearby parishes and to some crops not commonly grown. The Commerce and Vacherie soils are well suited to sugarcane, soybeans, vegetables, and fruit crops. The soils are also well suited to pasture. The Sharkey soils are well suited to rice and moderately well suited to soybeans. They are moderately well suited to improved pasture. The Allemands, drained; Harahan; Kenner, drained; and Westwego soils are suited to improved pasture, but most of the acreage of these soils in the parish is in urban uses. All other soils in the parish are not suited to cultivated crops or improved pasture because wetness and salinity are severe limitations and flooding is a severe hazard.

Differences among the soils in such factors as fertility needs, erodibility, organic matter content, water available for plant growth, soil tillage, drainage needs, flooding hazard, and cropping systems result in differences in crop suitability and management needs. Each farm has its own soil pattern and, therefore, its own management problems. Some principles of farm management, however, apply only to specific soils and to certain crops. This section presents the general principles of management that can be applied widely to the soils in Jefferson Parish.

Fertilizing and liming. The amount of fertilizer needed depends upon (1) the crop to be grown; (2) the past cropping history; (3) the level of yield desired; and (4) the kind of soil. Specific recommendations should be based on soil tests.

A soil sample for laboratory testing should consist of a single kind of soil and should represent no more than 10 acres. Agricultural agencies in the parish can supply

detailed information and instruction regarding the taking of soil samples.

The soils in Jefferson Parish generally range in reaction from medium acid to moderately alkaline in the upper 20 inches. They generally do not require lime. However, the drained marshes have highly oxidized organic material and a clayey layer at the surface that generally are extremely acid. Most of these pump-off areas were used to grow row crops many years ago, but the areas are in pasture, urban uses, or are idle at this time.

Organic matter content. Organic matter is important as a source of nitrogen for crops. Organic matter is also important in increasing the water intake rate, reducing surface crusting and soil loss by erosion, and in promoting a good mellow condition of the soil on the surface. Most soils in Jefferson Parish are moderately low in organic matter content, except the muck soils, which are very high in organic matter content.

Organic matter can be built up to a limited extent and maintained by leaving plant residue on the soil, by promoting growth of larger plants and plants that have extensive root systems, by adding animal manure, and by growing perennial grasses and legumes in rotation with other crops.

Soil tillage. The major purpose of soil tillage is to prepare a seedbed and to control weeds. Excessive cultivation of the soils should be avoided unless moisture conditions are optimum. Preparing a seedbed and cultivating and harvesting operations, however, generally destroy the soil structure. Some of the clayey soils in the parish become cloddy when cultivated. If loamy soils are plowed at the same depth for long periods or if they are wet when plowed, a compacted layer develops. A compacted layer is generally known as a traffic pan, or plowpan, and it develops just below plow depth. The development of such a layer can be avoided by not plowing when the soil is wet, by varying the depth of plowing, or by subsoiling or chiseling.

Some tillage implements stir the plow layer and leave crop residue on the surface for protection from beating rains. Use of such implements helps control erosion, reduce runoff, and increase infiltration.

Drainage needs and flooding hazard. Most soils in the parish need surface drainage. Early drainage methods involved a complex pattern of main ditches, laterals, and surface drainage field ditches. The more recent approach to drainage in this parish combines land leveling and grading with a minimum of surface drainage ditches. This approach creates larger and more uniform fields, which multirow farm machinery can more easily till.

The Mississippi River levee system protects most cropland and pastureland from flooding. Nevertheless, some soils at the lower elevations are subject to flooding from runoff from higher areas. Flooding in many of these areas is controlled only by constructing a ring levee system and by using pumps to remove excess water.

Water for plant growth. In Jefferson Parish water is commonly available for optimum plant growth without irrigation. Large amounts of rainfall occur in summer, and the distribution pattern favors the growth of sugarcane. The rainfall pattern precludes economical production of certain crops; cotton, for example, is better suited to a drier climate. The available water capacity of soils suited to crops is high to very high.

Cropping system. A desirable combination of crops in a good cropping system includes a legume for nitrogen, a cultivated crop to aid in weed control, a deep-rooted crop to utilize substratum fertility and maintain substratum permeability, and a close-growing crop to help maintain organic matter content. In a good cropping system, the sequence of crops should be such that the soil is covered as much of the year as possible.

A suitable cropping system varies with the needs of the farmer and the soil. Producers of livestock, for example, generally use cropping systems that have a higher percentage of pasture than do farmers of cash crops. Additional information on cropping systems can by obtained from the Soil Conservation Service, the Extension Service, or the Louisiana Agricultural Experiment Station.

Control of erosion. Erosion generally is not a serious problem in Jefferson Parish mainly because of the level to nearly level slope gradient. Nevertheless, sheet erosion is somewhat high on fallow, plowed fields and on newly constructed surface drainage ditches. Serious erosion takes place if side water inlets into drainage ditches are not installed initially. Sheet erosion can be reduced by maintaining a plant or plant residue cover on the soil, by holding the number of cultivations of a crop to a minimum, and by controlling weeds by methods other than fallow plowing. Newly constructed ditches need to be seeded immediately after construction. Water control structures either within channels or for side water entry into drainage ditches are necessary to control erosion.

Yields per acre

The average yields per acre that can be expected of the principal hay and pasture plants under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various hay and pasture plants depends on the kind of soil and the plant species. Management can

include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding plant species; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each plant species.

The estimated yields reflect the productive capacity of each soil for each of the principal grasses and legumes. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops and grasses and legumes other than those shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land capability classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have slight limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the section "Detailed soil map units."

Woodland management and productivity

Carl V. Thompson, Jr., state staff forester, Soil Conservation Service, helped prepare this section.

In Jefferson Parish, less than 6 percent of the land area, or about 14,000 acres, is hardwood forest, according to 1979 estimates by the Soil Conservation Service. Most of this acreage is in swamps in areas of general soil map unit 2, Barbary, described in the section "General soil map units." A small acreage is in general soil map unit 1, Sharkey-Commerce.

The few good stands of commercial trees in the parish have a low potential value. The old growth trees were harvested many years ago and regeneration has been slow on the ponded Barbary soils. Tree stands are better in areas of Commerce, Sharkey, and Vacherie soils, but these woodlands are small and owned by many landowners.

Table 6 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. The table lists the ordination (woodland suitability) symbol for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate;

and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *w* indicates excessive water in or on the soil.

The third part of the symbol, a numeral, indicates the kind of trees for which the soils are best suited and the severity of the hazard or limitation. The numerals 1, 2, and 3 indicate slight, moderate, and severe limitations, respectively, and that the soil is best suited for needleleaved trees. The numerals 4, 5, and 6 indicate slight, moderate, and severe limitations, respectively, and that the soil is best suited for broadleaved trees. The numerals 7, 8, and 9 indicate slight, moderate, and severe limitations, respectively, and that the soil is suited for both needleleaved and broadleaved trees.

In table 6, *slight, moderate,* and *severe* indicate the degree of the major soil limitations to be considered in management.

Ratings of the *erosion hazard* indicate the risk of loss of soil in well managed woodland. The risk is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive loss of soil.

Ratings of *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that the expected mortality is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

The *potential productivity* of merchantable or *common trees* on a soil is expressed as a *site index*. This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. Site index was determined at age 30 years for eastern cottonwood, 35 years for American sycamore, and 50 years for all other species. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Trees to plant are those that are suited to the soils and to commercial wood production.

Recreation

Jefferson Parish has many areas of scenic and historic interest. These areas are used for sightseeing, camping, hiking, fishing, picnicking, and boating. Grand Isle, and particularly Grand Isle State Park, is a large resort area. The Jean Lafitte National Park, primarily in Jefferson Parish, has wilderness areas that are accessible to the public. Other major parks in the parish are the Lafreniere Park and the Linear Park along the shore of Lake Pontchartrain. The state of Louisiana is planning a 600-acre state park along Bayou Segnette. Many smaller parks and recreation areas are in the towns and cities throughout the parish.

The soils of the survey area are rated in table 7 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 11 and interpretations for dwellings without basements and for local roads and streets in table 10.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface absorbs rainfall readily but remains firm, and is not dusty when dry.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking

areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is firm after rains and is not dusty when dry.

Paths and trails for hiking, horseback riding, and bicycling should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife habitat

Billy R. Craft, state staff biologist, Soil Conservation Service, helped prepare this section.

The large acreages of marshes, swamps, bayous, and ponds in the parish provide habitat for many species of fish and wetland wildlife.

The marshland part of Jefferson Parish is about 290,500 acres, or 70 percent, of the total area in the parish. However, this acreage is decreasing as urban areas continue to expand. Most species of waterfowl that use the Mississippi flyway either winter in the marsh or stop for food and rest during their migration to the tropics. The mottled duck is a permanent resident. Common furbearers in the marshes are nutria, muskrat, raccoon, otter, and mink (*14*). The American alligator is abundant, and the highest population currently is in the northern part of the parish in the swamps and freshwater marshes. The marshes also provide habitat for many species of both resident and migratory nongame birds. Large numbers of both the swamp rabbit and cottontail are in the coastal marsh area. The marshes are also a part of the coastal estuarine complex that makes a significant contribution to the support of the marine life from the Gulf of Mexico (*14*).

Three types of marsh, based on levels of salinity and the types of vegetation growing, are in Jefferson Parish. These are the *freshwater, brackish,* and *saline* marshes listed in the order of increasing salinity. The kinds and population densities of the wildlife using any given part of the marsh depend, to a large extent, upon the levels of salinity and native plants growing. The location and extent of the soils in each type of marsh is shown on the general soil map in the back of the survey.

The native plants in marshes differ in their tolerance to salt. The composition of the plants growing in marsh indicates the approximate levels of salinity. Table 8 provides a list of native plants growing in the soils of each type of marsh.

The *saline marsh* is adjacent to the Gulf of Mexico and extends inland for a distance of about 10 miles. It covers an area of about 81 square miles, or about 18 percent of the marshland in the parish. The main soils in the saline marsh include those of the Scatlake and Timbalier series. Soils of the saline marsh are regularly inundated by saltwater from the Gulf. Levels of salinity in the saline marsh range from about 0.62 to 51.88 parts per thousand (ppt) with a mean of 16 ppt (*3, 5, 6, 14*). The native plants growing in these soils are tolerant of high levels of salinity. The dominant plants include smooth cordgrass, seashore saltgrass, needlegrass rush, marshhay cordgrass, bushy sea-oxeye, Virginia samphire, and saltwort (fig. 5).

The saline marsh is part of an estuary that provides a nursery for crustaceans and saltwater fish such as shrimp, blue crab, menhaden, croaker, spot, bay anchovy, and others that spawn in the Gulf of Mexico. The population density of ducks, nutria, American alligator, and swamp rabbit is low. Moderate numbers of geese, muskrat, mink, otter, and raccoon use the saline marsh.

The *brackish marsh* is in an area between the saline marsh and the freshwater marsh. It extends northward from Mud Lake for a distance of about 18 miles. The brackish marsh covers an area of about 268 miles, or about 59 percent of the marshland in the parish. The main soils in the brackish marsh include the Clovelly and Lafitte soils. The levels of salinity in soils of the brackish marsh range from about 0.42 to 28.08 ppt with a mean of 8 ppt (*3, 5, 6, 14*). The native plants growing in these soils are tolerant of moderate amounts of salt. The dominant plants include marshhay cordgrass, dwarf spikerush, Olney bulrush, coastal waterhyssop, and saltmarsh morningglory.

Soils of the brackish marsh provide habitat for large numbers of geese, mink, otter, raccoon, and, especially, muskrat. The native plants in the brackish marsh provide a source of food most favored by geese. Moderate numbers of ducks, nutria, American alligator, and swamp rabbits use the brackish marsh. White-tailed deer also use the brackish marsh. The brackish marsh is also part of the estuary that provides a nursery for some species of fish and crustaceans.

The *freshwater marsh* is in the northernmost part of the coastal marsh in Jefferson Parish. It covers an area of about 104 square miles, or about 23 percent of the total marshland in the parish. The main soils in the freshwater marsh include those of the Allemands, Kenner, and Larose series. The level of salinity in these soils ranges from about 0 to 5 ppt (*3, 5, 6, 14*). The

Figure 5.—Smooth cordgrass is the main vegetation on Scatlake muck in the saline marsh.

native plants are very intolerant of salt. The dominant plants include maidencane, bulltongue, alligatorweed, cattail, southern wildrice, pickerelweed, swamp knotweed, and common rush (fig. 6).

Areas of freshwater marsh provide habitat for large numbers of crawfish, ducks, nutria, mink, otter, raccoon, swamp rabbits, white-tailed deer, and American alligator. Moderate numbers of geese also use the freshwater marsh. The freshwater marsh has the lowest muskrat population of the three types of marsh. Many species of freshwater fish are in the ponds and streams within the freshwater marsh.

The swamps of Jefferson Parish are mainly in a narrow band in the northern part of the parish, between Lakes Cataouatche and Salvador, and the areas of urban land. The swamps make up about 20,750 acres, or 5 percent of the total area of the parish. This acreage is decreasing as urban areas expand into the swamps. The main soils in swamps include those of the Barbary series. These soils are mainly in woodland. The main native trees on these soils are baldcypress, black willow, and water tupelo. The main species of understory and aquatic plants are alligatorweed, butterweed, buttonbush, duckweed, and water hyacinth. These soils provide habitat for a large population of mink, otter, raccoon, crawfish, squirrels, wood ducks and migratory ducks, alligators, wading birds, and other nongame birds. Deer, cottontail and swamp rabbits, and turkey use these areas when they are dry or not flooded too deeply.

Few areas of openland for habitat remain in the parish because of urbanization. Those areas are mainly in pasture or are idle land and provide poor habitat for most species of wildlife. Inadequate cover and urban use limit the habitat available. However, some small game species such as cottontail rabbits, doves, and nongame species of birds use these areas.

The many saline, brackish, and freshwater lakes and perennial streams in Jefferson Parish produce large populations of freshwater and saltwater species of fish. These areas of open water make up about 179,000 acres, or 43 percent of the parish. Both sport and commercial fishing are important in the parish.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 9, the soils in the survey area are rated according to their potential for providing habitat for various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are fescue, lovegrass, clover, and vetch.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, panicum, and fescue.

Figure 6.—Maidencane is the main grass on Allemands muck in the freshwater marsh.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, poplar, sweetgum, dogwood, hickory, blackberry, and blueberry. Examples of fruit-producing shrubs that are suitable for planting on soils rated *good* are hawthorn, persimmon, and sumac.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, and slope. Examples of wetland plants are smartweed, wild millet, wildrice, saltgrass, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are wetness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, geese, shore birds, muskrat, mink, and otter.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of earthfill and topsoil; (7) plan drainage systems, irrigation systems, ponds, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building site development

Table 10 shows the degree and kind of soil limitations that affect shallow excavations, dwellings without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and

observed performance of the soils. The ease of digging, filling, and compacting is affected by a very firm dense layer, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary facilities

Table 11 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 11 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, and flooding affect absorption of the effluent.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to effectively filter the effluent. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 11 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, flooding, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 11 are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction materials

Table 12 gives information about the soils as a source of roadfill and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by a high water table and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* have at least 5 feet of suitable material and a low shrink-swell potential. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10 and a high shrink-swell potential. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by a water table and toxic material.

Soils rated *good* have friable loamy material to a depth of at least 40 inches. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, or soils that have an appreciable amount of soluble salts. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have soluble salts, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water management

Table 13 gives information on the soil properties and site features that affect water management. The degree

and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of organic matter or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by slope and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness and slope affect the construction of grassed waterways. Low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering index properties

Table 14 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil series and their morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains particles coarser than sand, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (*2*) and the system adopted by the American Association of State Highway and Transportation Officials (*1*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as SP and SM; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as Pt. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and chemical properties

Table 15 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, and plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3 bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and

organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.05 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 15, the estimated content of organic matter of the plow layer is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and water features

Table 16 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils not protected by vegetation are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, nor is water in swamps and marshes.

Table 16 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs during the growing season on an average of twice or less in 5 years; and *frequent* that it occurs during the growing season on an average of more than twice in five years. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 or 7 days, and *long* if more than 7 days. Probable dates are expressed in months; November–June, for example, means that flooding can occur during the period November through June.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons that form in soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 16 are the depth to the seasonal high water table; the kind of water table—that is, perched, artesian, or apparent; and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 16.

An *apparent water* table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Only saturated zones within a depth of about 6 feet are indicated. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high

the water rises above the surface. The second numeral indicates the depth below the surface.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence results from either dessication and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 16 shows the expected initial subsidence, which usually is a result of drainage, and annual subsidence, which usually is a result of oxidation and consolidation.

Not shown in the table is subsidence caused by an imposed surface load or by the withdrawal of ground water throughout an extensive area as a result of lowering the water table.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Urban development features

Expansion of the New Orleans metropolitan area into Jefferson Parish has resulted in the development of portions of the nearby marshes and swamps for urban uses. The organic soils and semifluid mineral soils in these marshes and swamps are severely limited for most urban uses because of flooding, wetness, and the low to high subsidence potential. Although wetness and flooding are common problems on many of the soils in the parish, subsidence is a problem unique to the organic soils and the semifluid mineral soils in the marshes and swamps.

Subsidence

Subsidence is the loss of surface elevation after an organic soil or a semifluid mineral soil is artificially drained.

Subsidence on organic soils after drainage is attributed mainly to four factors: (1) shrinkage caused by desiccation, (2) consolidation from loss of the buoyant force of ground water or from loading, or both, (3) compaction, and (4) biochemical oxidation.

The problems associated with subsidence in the survey area are mainly in the following map units: Allemands muck, drained; Harahan clay; Kenner muck, drained; and Westwego clay.

Elevation loss caused by the first two factors is termed *initial subsidence*, and it is normally completed about 3 years after the water table is lowered. Initial subsidence of organic soils results in a reduction of thickness of the organic materials above the water table by about 50 percent. It is accompanied by permanent open cracks that do not close when the soil is re-wet.

After initial subsidence, shrinkage continues at a uniform rate because of the biochemical oxidation and subsequent disintegration of the organic materials. This is termed *continued subsidence*, and it progresses until the mineral material or the permanent water table is reached. The rate of continued subsidence depends upon temperature (amount of time per year above 41 degrees Fahrenheit, 5 degrees Centrigrade), the mineral content, and thickness of the organic layers above the water table. The average rate of continued subsidence in the survey area is about 1/2 inch to 2 inches per year. The total subsidence potential is as much as 144 inches on some soils.

An important feature of organic soils is low bulk density (weight per unit volume). The bulk density, in grams per cubic centimeter, for selected materials is as follows:

	G/cm³
Water	1.0
Mineral soil	1.2 to 1.7
Organic soil	0.15 to 0.5

The low bulk density reflects the small volume of mineral matter in organic soil material. The mineral content of organic soil material is about 6 percent on a volume basis compared to about 40 percent for mineral soil. The rest of the volume is organic matter and pore space filled with air and water. This accounts for compressibility under load, volume change upon drying, and general instability if used as foundation materials.

Semifluid, mineral soil layers have a potential for initial subsidence caused by loss of water and consolidation after drainage. Each time the water table is lowered and the semifluid soil material is drained, a new increment of initial subsidence takes place. Continued subsidence after drainage on soils that have semifluid mineral layers is minor.

Additional urbanization on organic soils and semifluid mineral soils can lead to increased subsidence if the water table is lowered. Because of the hard surface cover by the addition of streets, parking lots, buildings, and other structures, the absorptive capacity of the soil is decreased. This increases runoff; consequently, drainage canal size and pumping capacity are generally

increased to accommodate the additional runoff. As a result of the more intensive drainage, the water table is lowered. This is accompanied by a new increment of initial subsidence. With this new depth of drainage ditches, pumping capacity must again be increased to prevent flooding. This cycle will continue until all of the organic material has been oxidized and the mineral layers dewatered; however, this seemingly endless cycle can be interrupted.

Subsidence of organic soils can be effectively controlled by maintaining the water table at the surface. Subsidence can be reduced to some degree by covering the surface with mineral soil materials to slow oxidation. It can be further reduced by raising the water table as high as possible to reduce the thickness of organic material between the mineral soil fill material and the water table. In land use decisions, a choice must be made in controlling the water table: (1) to use the land without drainage to control subsidence, (2) to use the land with some drainage, but to tolerate wet conditions and minimum subsidence, or (3) to provide better drainage and tolerate subsidence at a greater rate.

Subsidence is a very severe limitation for most urban uses in the survey area. Unless piling is used to support buildings, they tilt and foundations crack. Organic soils around structures built on piling subside and periodic filling is needed to maintain a desirable surface elevation. When organic soils subside, foundations are exposed, and unsupported driveways, patios, air conditioner slabs, and sidewalks crack and warp and gradually drop below original levels (fig. 7). Some driveways have subsided to the extent that it is not possible to drive into carports. Underground utility lines may be damaged.

According to a report of land subsidence problems and maintenance costs in an area east of New Orleans, the estimated total direct cost to homeowners in the study area was significant. In 1975, as much as 7.5 percent of homeowners in some areas were paying more than 500 dollars per year for subsidence-related damage

Figure 7.—Subsidence on this Kenner muck, drained, exposes building foundations and causes driveways and sidewalks to warp and crack.

repairs. Also, indirect costs reflected in property costs, utility rates, taxes, and federal subsidies would make the full cost considerably higher (*4*).

Suggestions and alternatives to counteract subsidence

The concern of homeowners and communities with subsidence is finding ways to resolve the problems. The following is a brief discussion of some of the things that can be done to minimize the problems of subsidence.

A. Selection of building site.—Avoid sites that have organic or semifluid mineral soil layers. Table 16 gives the subsidence potential of each soil. The final selection should be based on onsite examination of the soil.

B. Structure design and materials.—The recommendations of qualified professionals such as structural engineers, soil engineers, and architects should be followed. New or innovative construction techniques and materials may minimize some problems. For example, constructing buildings on piers above ground instead of on concrete slabs on the ground may help overcome some problems. The possibility of gas accumulating under the slabs would be eliminated as well as the need for fill material to cover exposed slabs. The use of small sections of easily moved, unjoined fabricated material or concrete in the construction of sidewalks, driveways, and patios would eliminate cracking and possibly make re-leveling after subsidence easier. Other construction materials such as brick, shell, gravel, or lightweight aggregate could be considered for these uses.

C. Initial site fill practices.—Subsidence can be reduced by the addition of mineral fill material to the organic soil surface. Thin blankets of fill that do not reach the permanent water table will reduce the rate of subsidence. The amount of reduction is related to the amount of oxygen that is excluded from organic layers and the thickness of organic layers above the water table. If the base of the mineral fill material is within the permanent water table, subsidence caused by oxidation of organic materials will be eliminated. Future subsidence, unless the water table is lowered, will be limited to compaction or displacement. Loamy mineral soil material is generally considered the most desirable fill material. Fill material high in organic content should be avoided.

D. Maintenance or continual filling practices.—To maintain the esthetic value of homesites, filling is necessary on organic soils. This helps avoid sunken lawns and exposed foundation footings that result from subsidence. If several inches or more of subsidence occurs, additions of small amounts or thin layers of fill is generally preferable over adding thick layers. Regular addition of 1 or 2 inches of fill material as needed generally will not permanently harm most lawn grasses and landscaping plants. If filling is postponed until several inches to a foot or more of fill is required, the thick layers of fill will possibly permanently damage lawn grasses and landscape plants.

E. Underground utilities.—Engineering innovations that allow for movement of utility lines with changes in soil surface elevations should reduce the number of failures. For example, flexible pipes at joints where pipes are connected to stationary structures could possibly be used rather than rigid pipes.

F. Water level control.—Water level or depth to the continuous water table is an important factor affecting the rate of subsidence. Usually, the nearer to the surface that the water table is maintained, the slower the rate of subsidence. Microdifferences in surface elevation that occur in most urban developed areas contribute to uneven water table depths and to differences in rates of subsidence. Precision leveling within an area for urban uses would help eliminate the differences in water table depth. Also, a carefully designed and constructed drainage system would make it possible to maintain a desirable, uniform water table throughout the level area. In developed unleveled areas, a system to monitor the level of the water table would provide information needed to determine optimum water table levels.

G. Site development on organic soils.—Generally, this involves first building a levee and a pumping system to lower the water table below the organic layers. Sufficient time (1 to 3 years) is necessary for initial subsidence. The area then could be backfilled hydrologically or by other methods with mineral fill material to a desired level to help reduce possible flooding. The mineral fill material would load and compact the organic layers. Then the water table could be raised to a level where the organic layers would be permanently inundated. By keeping the water table above the organic layers, oxygen would be excluded. Under this condition the organic materials would be preserved; therefore, subsidence would be at a minimum and the soils of the area would be stable for urban use. In addition, a few feet of proper mineral fill material would provide a good environment for utility lines.

Classification of the soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*13*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. In table 17, the soils of the survey area are classified according to the system. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning flood plain, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, nonacid, thermic Aeric Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil series and their morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the Soil Survey Manual (*11*). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (*13*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed soil map units."

Allemands series

The Allemands series consists of level, poorly drained and very poorly drained, very slowly permeable organic soils. The soils formed in moderately thick accumulations of decomposed herbaceous material and the underlying clayey alluvium. These soils are in freshwater coastal marshes. Unless drained, they are flooded or ponded most of the time. Elevation ranges from about 1 foot above sea level to 5 feet below sea level. Slope is less than 0.5 percent.

Soils of the Allemands series are clayey, montmorillonitic, euic, thermic Terric Medisaprists.

Allemands soils commonly are near Barbary, Kenner, Larose, and Sharkey soils and are similar to the Clovelly soils. The Barbary soils are in swamps and are semifluid mineral soils. The Clovelly, Kenner, and Larose soils are in positions similar to those of the Allemands soils. The Clovelly soils are more saline than Allemands soils. The Kenner soils have thin layers of mineral material in the upper part of the profile. Larose soils are semifluid mineral soils. The Sharkey soils are in higher positions than Allemands soils and are firm mineral soils.

Typical pedon of Allemands muck, 1 mile southwest of Bayou Segnette pumping station on the southeast side of a canal.

Oe1—0 to 6 inches; very dark grayish brown (10YR 3/2) muck; 80 percent fiber, 50 percent rubbed; massive; dominantly herbaceous fiber; does not flow between fingers when squeezed; 40 percent mineral; slightly acid; clear smooth boundary.

Oa1—6 to 12 inches; very dark grayish brown (10YR 3/2) muck; 60 percent fiber, 12 percent rubbed; massive; does not flow between fingers when squeezed; 50 percent mineral; slightly acid; clear smooth boundary.

Oa2—12 to 23 inches; very dark grayish brown (10YR 3/2) muck; 70 percent fiber, 9 percent rubbed; massive; small amount flows through fingers when squeezed; few fragments of wood; 50 percent mineral; color changes to very dark grayish brown (10YR 3/2) after exposure to air; neutral; abrupt smooth boundary.

IIC1g—23 to 35 inches; gray (5Y 5/1) clay; massive; flows easily between fingers when squeezed leaving hand empty; neutral; abrupt smooth boundary.

IIC2g—35 to 40 inches; dark gray (5Y 4/1) mucky clay with thin strata of black (10YR 2/1) peat; massive; flows easily between fingers when squeezed leaving hand empty; neutral; abrupt smooth boundary.

IIC3g—40 to 55 inches; gray (5Y 5/1) clay; massive; flows easily through fingers when squeezed leaving hand empty; moderately alkaline; abrupt smooth boundary.

Oa3—55 to 60 inches; dark brown (7.5YR 4/2) muck; 25 percent fiber, less than 5 percent rubbed; massive; dominantly herbaceous fiber; flows easily between fingers when squeezed leaving small residue; moderately alkaline.

The thickness of the organic material ranges from 16 to 51 inches. The underlying mineral material is dominantly clay, but there are thin strata of loamy material in some pedons.

The surface tier (0 to 12 inches) has hue of 10YR, value of 2 to 4, and chroma of 1 or 2. The content of rubbed fiber ranges from 5 to 30 percent. Reaction ranges from strongly acid to slightly acid in undrained pedons and from extremely acid to strongly acid in pedons that have been drained.

The organic material in the subsurface tier (12 to 23 inches) has hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 1 to 3. The content of fiber ranges from 1 to 10 percent after rubbing. Reaction ranges from slightly acid to mildly alkaline in undrained pedons. In drained pedons, reaction ranges from strongly acid to slightly acid.

The IICg horizon has hue of 5Y, 5G, or 5GY; value of 4 or 5; and chroma of 1 or 2. Reaction ranges from slightly acid to moderately alkaline in undrained pedons. In drained pedons, where the IICg horizon is above a depth of 40 inches, reaction ranges from very strongly acid to slightly acid, and where this horizon is below a depth of 40 inches, reaction ranges from slightly acid to moderately alkaline.

Barbary series

The Barbary series consists of level, very poorly drained, very slowly permeable, semifluid mineral soils. The soils formed in clayey alluvium. These soils are in swamps that are flooded or ponded most of the time. Elevation ranges from sea level to about 2 feet above sea level. Slope is less than 0.2 percent.

Soils of the Barbary series are very-fine, montmorillonitic, nonacid, thermic Typic Hydraquents.

Barbary soils commonly are near Sharkey soils and are similar to Larose and Scatlake soils. The Larose and Scatlake soils are in marshes and contain fewer logs and stumps than Barbary soils. In addition, Scatlake soils are more saline. The Sharkey soils are in higher positions than Barbary soils and are firm mineral soils.

Typical pedon of Barbary muck, 1 mile south of the Bayou Segnette pumping station.

O2—0 to 6 inches; dark brown (7.5YR 3/2) muck; massive; flows easily between fingers when squeezed leaving small residue in hand; 30 percent fiber; upper 3 inches dominantly plant stems and roots; slightly acid; clear smooth boundary.

C1g—6 to 36 inches; dark gray (5Y 4/1) clay; massive; flows easily between fingers when squeezed leaving hand empty; many decomposed woody fragments and roots; neutral; clear smooth boundary.

C2g—36 to 66 inches; stratified dark gray (5Y 4/1) clay and dark gray (5Y 4/1) mucky clay; massive; flows easily between fingers when squeezed leaving hand empty; common woody fragments; moderately alkaline.

Depth to firm mineral layers is 60 inches or more.

The O2 horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 or 2. It is muck or peat and is 2 to 8 inches thick. Reaction ranges from slightly acid to mildly alkaline.

Some pedons have an A1 horizon of dark gray mucky clay. Reaction ranges from neutral to mildly alkaline.

The C horizon has hue of 10YR, 2.5Y, 5Y, 5GY, or 5BG; value of 4 or 5; and chroma of 1. Few to many buried logs, stumps, and wood fragments are in the C horizon. Reaction ranges from neutral to moderately alkaline.

Clovelly series

The Clovelly series consists of level, very poorly drained, very slowly permeable, saline, semifluid organic soils. The soils formed in moderately thick accumulations of decomposed herbaceous plant material overlying clayey alluvium. These soils are in brackish coastal marshes that are ponded or flooded most of the time. Elevation ranges from sea level to about 1 foot above sea level. Slope is less than 0.2 percent.

Soils of the Clovelly series are clayey, montmorillonitic, euic, thermic Terric Medisaprists.

Clovelly soils are similar to Allemands soils and commonly are near Lafitte and Scatlake soils. The Allemands soils are in freshwater marshes and are less saline than Clovelly soils. The Lafitte soils are in positions similar to those of the Clovelly soils and have organic material that is more than 51 inches thick. The Scatlake soils are in nearby saline marshes and are more saline than Clovelly soils. In addition, Scatlake soils are semifluid mineral soils.

Typical pedon of Clovelly muck, in an area of Lafitte-Clovelly association, 5 miles southeast of Lafitte and 2,000 feet east of the intersection of Cheniere Traverse Bayou and Bayou Dupont.

Oa1—0 to 6 inches; very dark grayish brown (10YR 3/2) muck; about 30 percent fiber, 10 percent rubbed; massive; flows easily between fingers when squeezed leaving hand empty; about 50 percent mineral; mildly alkaline; clear smooth boundary.

Oa2—6 to 40 inches; very dark brown (10YR 2/2) muck; about 5 percent fiber, 1 percent rubbed; massive; flows easily between fingers when squeezed leaving small residue in hand; about 55 percent mineral; moderately alkaline; abrupt wavy boundary.

IICg—40 to 84 inches; greenish gray (5BG 5/1) clay; massive; flows easily between fingers when squeezed leaving hand empty; moderately alkaline.

The thickness of the organic material ranges from about 16 to 51 inches. The organic material is dominantly sapric material, but some pedons have a thin surface layer of hemic or fibric materials. The electrical conductivity ranges from 4 to 8 millimhos per centimeter in at least one layer between the surface and a depth of 40 inches.

The organic layers have hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 1 or 2. The mineral content ranges from 40 to 60 percent. Reaction ranges from neutral to moderately alkaline.

The IIAb horizon, where present, is mucky clay, clay, or silty clay. It has hue of 10YR or 5Y, value of 2 to 4, and chroma of 1 or 2. The *n* value ranges from 0.7 to 1.0. Reaction is mildly alkaline or moderately alkaline.

The IIC horizon has hue of 10YR, 5Y, 5BG, 5GY, or 5G; value of 4 to 6; and chroma of 1, or it is neutral. The texture is clay, silty clay, or mucky clay. Reaction is mildly alkaline or moderately alkaline. The *n* value to a depth of 60 inches or more ranges from 0.7 to more than 1.0.

Commerce series

The Commerce series consists of level, somewhat poorly drained, moderately slowly permeable, firm mineral soils. The soils formed in loamy alluvium. They are on the high and intermediate parts of the natural levees along the Mississippi River and its distributaries. Slope is less than 1 percent.

Soils of the Commerce series are fine-silty, mixed, nonacid, thermic Aeric Fluvaquents.

Commerce soils commonly are near Sharkey and Vacherie soils. The Sharkey soils are in lower positions than Commerce soils and are clayey throughout. The Vacherie soils are in positions similar to those of the Commerce soils and have a loamy surface layer and subsoil and clayey underlying material.

Typical pedon of Commerce silt loam, 500 feet east of the L.W. Higgins High School, 3,000 feet south of the West Bank Expressway, and 3,200 feet east of Westwego Airport; sec. 88, T. 14 S., R. 11 E.

Ap—0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam; about 40 percent dark grayish brown (10YR 4/2) silt loam; weak medium subangular blocky structure; friable; many earthworms; neutral; abrupt wavy boundary.

B2—4 to 14 inches; grayish brown (10YR 5/2) silt loam; few fine faint yellowish brown mottles; weak coarse subangular blocky structure; friable; mildly alkaline; clear smooth boundary.

B3—14 to 24 inches; dark grayish brown (10YR 4/2) silt loam; common fine faint yellowish brown and grayish brown mottles; weak coarse subangular blocky structure; friable; moderately alkaline; clear smooth boundary.

C1—24 to 45 inches; grayish brown (10YR 5/2) loam; common medium faint yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; moderately alkaline; gradual smooth boundary.

C2—45 to 60 inches; grayish brown (10YR 5/2) silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; massive; firm; moderately alkaline.

Thickness of the solum ranges from 20 to 40 inches.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. It is silt loam or silty clay loam, and thickness ranges from 4 to 10 inches. Reaction ranges from medium acid to moderately alkaline.

The B horizon has hue of 10YR, value of 4 or 5, and chroma of 2. It is silt loam, loam, or silty clay loam. Reaction ranges from slightly acid to moderately alkaline.

Some pedons have a buried A horizon that has the same colors as the A1 or Ap horizon. Reaction ranges from neutral to moderately alkaline.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. It is silt loam, silty clay loam, silty clay, or very fine sandy loam and commonly is stratified. Reaction ranges from neutral to moderately alkaline.

Felicity series

The Felicity series consists of gently undulating, somewhat poorly drained, very rapidly permeable, saline, firm mineral soils. The soils formed in sandy tidal sediments. These soils are on ridges along the Gulf of Mexico. They are occasionally flooded by tidal waters during storms. Elevation ranges from about 2 to 5 feet above sea level. Slopes range from 0 to 3 percent.

Soils of the Felicity series are mixed, thermic Aquic Udipsamments.

Felicity soils commonly are near Scatlake and Timbalier soils. Scatlake and Timbalier soils are in nearby saline marshes. The Scatlake soils are semifluid mineral soils, and the Timbalier soils are organic soils.

Typical pedon of Felicity loamy fine sand, occasionally flooded, 2 miles southwest of Highway 1, on the northeast section line of sec. 12, T. 22 S., R. 24 E., at its intersection with the Gulf of Mexico.

C1—0 to 5 inches; brown (10YR 5/3) loamy fine sand; single grained; very friable; about 10 percent shell fragments; moderately alkaline; clear wavy boundary.

C2—5 to 20 inches; brown (10YR 5/3) loamy fine sand; many medium faint dark grayish brown (10YR 4/2) mottles; single grained; very friable; about 5 percent shell fragments; moderately alkaline; clear wavy boundary.

C3—20 to 38 inches; yellowish brown (10YR 5/4) loamy fine sand; common medium faint gray (10YR 5/1) mottles; single grained; very friable; few shell fragments; moderately alkaline; abrupt wavy boundary.

Ab—38 to 60 inches; black (10YR 2/1) loamy fine sand; single grained; very friable; few shell fragments; moderately alkaline.

Depth to the Ab horizon ranges from 24 to 40 inches. Salinity ranges from 8 to 16 millimhos per centimeter throughout the control section. Reaction ranges from neutral to moderately alkaline throughout the profile. Shells and fragments of shells account for 0 to 15 percent of the weight of the soil. The texture throughout the profile is sand, loamy sand, or loamy fine sand.

The A1 horizon, where present, is thin and has hue of 10YR, value of 2 to 4, and chroma of 1 to 3.

The C horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 2 to 4. Mottles that have chroma of 1 or 2 are in the C horizon at a depth of 10 to 40 inches below the surface.

The Ab horizon has hue of 10YR, 2.5Y, or 5Y; value of 2 to 4; and chroma of 1 to 3. Some pedons are underlain by loamy, clayey, or organic materials at a depth between 40 and 60 inches below the surface.

Harahan series

The Harahan series consists of level, poorly drained, very slowly permeable soils. The soils formed in clayey alluvium. These soils are firm in the upper part and semifluid in the lower part. These soils are in drained, former swamps in the lower part of the Mississippi River flood plain. They are protected from flooding by levees and drained with pumps. Elevation ranges from about 1 foot above sea level to about 2 feet below sea level. Slope is less than 0.5 percent.

Soils of the Harahan series are very-fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts.

Harahan soils commonly are near Commerce, Sharkey, and Westwego soils. Both the Commerce and Sharkey soils are in higher positions than the Harahan soils. Commerce soils are fine-silty, and Sharkey soils have an *n* value of less than 0.7 throughout. The Westwego soils are in positions similar to those of the Harahan soils and have organic layers within the control section.

Typical pedon of Harahan clay, in Gretna, 1,300 feet west of Belle Chasse Highway, 200 feet south of Gretna Boulevard, on west side of Gould Fire Company No. 2, and 3,100 feet south of northeast corner of sec. 43, T. 14 S., R. 24 E.

Ap—0 to 4 inches; very dark gray (10YR 3/1) clay; few medium faint dark yellowish brown (10YR 4/4) mottles; moderate medium subangular blocky structure; firm; few clam shells; slightly acid; abrupt smooth boundary.

B21—4 to 13 inches; dark gray (10YR 4/1) clay; few fine faint dark yellowish brown mottles; weak coarse subangular blocky structure; firm; patchy reddish brown stains on faces of peds; common, shiny pressure faces; medium acid; clear wavy boundary.

B22—13 to 20 inches; very dark gray (10YR 3/1) clay; few fine faint dark yellowish brown mottles; weak medium subangular blocky structure parting to moderate fine subangular blocky; firm; common, shiny pressure faces on surfaces of peds; strongly acid; abrupt wavy boundary.

Ab—20 to 32 inches; black (10YR 2/1) clay; moderate medium subangular blocky structure; firm; few fine roots; few wood fragments; slightly acid; abrupt wavy boundary.

C1g—32 to 65 inches; gray (5Y 5/1) clay; massive; flows easily between fingers when squeezed leaving a small residue in hand; few wood fragments; moderately alkaline; abrupt smooth boundary.

C2g—65 to 70 inches; dark gray (5Y 4/1) clay; massive; flows easily between fingers when squeezed leaving hand empty; moderately alkaline; abrupt smooth boundary.

C3g—70 to 75 inches; dark gray (5Y 4/1) clay; massive; flows with difficulty between fingers when squeezed leaving moderate amount of residue in hand; few wood fragments; moderately alkaline.

Thickness of the solum ranges from 20 to 40 inches. Depth to layers with *n* values greater than 0.7 ranges from 20 to 40 inches.

The A horizon and the O horizon, where present, have hue of 10YR, value of 2 to 4, and chroma of 1 or 2, or they are neutral. Texture is clay, musky clay, or muck. Reaction ranges from strongly acid to neutral.

The B horizon has hue of 10YR, 2.5Y, 5Y, 5GY, or 5BG; value of 3 to 5; and chroma of 1 or 2, or it is neutral. Texture is clay or silty clay. Reaction ranges from strongly acid to neutral.

The Ab horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2, or it is neutral. Texture is clay, silty clay, or mucky clay. Reaction ranges from strongly acid to neutral.

The C horizon has hue of 10YR, 2.5Y, 5Y, 5BG, 5GY, or 5G; value of 2 to 5; and chroma of 1 or 2, or it is neutral. Texture is clay, silty clay, or mucky clay. Reaction ranges from neutral to moderately alkaline.

Kenner series

The Kenner series consists of level, very poorly drained and poorly drained, rapidly permeable and very rapidly permeable organic soils. The soils formed in herbaceous plant material in freshwater marshes. Unless drained, these soils are ponded or flooded most of the time. Elevation ranges from about 1 foot above sea level to 5 feet below sea level. Slope is less than 0.5 percent.

Soils of the Kenner series are euic, thermic, Fluvaquentic Medisaprists.

Kenner soils commonly are near Allemands, Barbary, and Larose soils and are similar to Lafitte and Timbalier soils. The Allemands and Larose soils are in positions similar to those of the Kenner soils. The Allemands soils do not have mineral layers in the upper part of the profile, and Larose soils are semifluid and mineral throughout. The Barbary soils are in nearby swamps and are semifluid and mineral throughout. The Lafitte and Timbalier soils are in nearby brackish and saline marshes and are more saline than Kenner soils.

Typical pedon of Kenner muck, near southwest end of sec. 92, T. 14 S., R. 22 E., and 330 feet southeast of Lake Cataouatche protection levee canal.

Oe1—0 to 12 inches; very dark gray (10YR 3/1) muck; about 40 percent fiber, 18 percent rubbed; weak fine granular structure; flows with difficulty between fingers when squeezed leaving a large residue in hand; many coarse live roots; dominantly herbaceous fiber; about 45 percent mineral; neutral; abrupt smooth boundary.

IIC1g—12 to 19 inches; gray (5Y 5/1) clay; massive; flows easily between fingers when squeezed leaving hand empty; mildly alkaline; abrupt smooth boundary.

Oa1—19 to 23 inches; very dark grayish brown (10YR 3/2) muck; about 20 percent fiber, 3 percent rubbed; massive; flows easily between fingers when squeezed leaving a small residue in hand; dominantly herbaceous fiber; about 50 percent mineral; mildly alkaline; abrupt smooth boundary.

Oa2—23 to 38 inches; very dark gray (10YR 3/1) muck; about 15 percent fiber, 1 percent rubbed; massive; flows easily between fingers when squeezed leaving hand empty; dominantly herbaceous fiber; about 50 percent mineral; mildly alkaline; abrupt smooth boundary.

IIC2g—38 to 42 inches; dark gray (5Y 4/1) clay; massive; flows easily between fingers when squeezed leaving hand empty; mildly alkaline; abrupt smooth boundary.

Oa3—42 to 99 inches; black (10YR 2/1) muck; about 15 percent fiber, 2 percent rubbed; massive; flows easily between fingers when squeezed leaving a small residue in hand; dominantly herbaceous fiber; about 65 percent mineral; several 1/2-inch strata with fiber content ranging from 10 to 30 percent; mildly alkaline.

Thickness of the organic material that has thin mineral layers ranges from 51 to more than 100 inches. Depth to thin mineral strata ranges from 12 to 51 inches.

The organic material in the surface tier (0 to 12 inches) has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. The rubbed fiber content ranges from 5 to 60 percent, and the mineral content ranges from 40 to 70 percent. In undrained pedons, the reaction ranges from slightly acid to neutral. In drained pedons, reaction ranges from extremely acid to strongly acid. In some pedons, a thin overwash of clay is present.

The organic material in the subsurface and bottom tiers (12 to 51 inches) has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. The rubbed fiber content ranges from 1 to 8 percent. Reaction ranges from neutral to moderately alkaline.

Thickness of mineral strata (IICg horizons) within the subsurface and bottom tiers ranges from 1 millimeter to 25 centimeters. The IICg horizon has hue of 5Y, 5GY, or 10YR; value of 2 to 5; and chroma of 1. In undrained pedons, reaction ranges from neutral to moderately alkaline. In drained pedons, reaction ranges from strongly acid to extremely acid. The IICg horizon is clay, silty clay, or mucky clay.

Lafitte series

The Lafitte series consists of level, very poorly drained, saline organic soils. The soils are moderately rapidly permeable in the upper part and very slowly permeable in the lower part. They formed in decomposed herbaceous plant material. These soils are in the brackish Gulf Coast marshes. They are ponded or almost continuously flooded. Elevation ranges from sea level to about 1 foot above sea level. Slope is less than 0.2 percent.

Soils of the Lafitte series are euic, thermic Typic Medisaprists.

Lafitte soils are similar to Kenner and Timbalier soils and commonly are near Clovelly soils. Clovelly soils have thinner organic layers over the mineral material than the Lafitte soils. The Kenner soils are in freshwater marshes and are not so saline as Lafitte soils. Timbalier soils are in saline marshes and are more saline throughout than Lafitte soils.

Typical pedon of Lafitte muck, in an area of Lafitte-Covelly association, in the extreme northwest corner of sec. 48, T. 16 N., R. 12 E.

Oa1—0 to 12 inches; dark brown (7.5YR 3/2) muck; about 20 percent fiber; 8 percent rubbed; massive; flows with difficulty between fingers when squeezed leaving small residue in hand; about 40 percent mineral; mildly alkaline; clear wavy boundary.

Oa2—12 to 56 inches; black (10YR 2/1) muck; about 30 percent fiber, 5 percent rubbed; massive; flows easily between fingers when squeezed leaving hand empty; about 50 percent mineral; moderately alkaline; abrupt wavy boundary.

IIC1g—56 to 78 inches; dark gray (5Y 4/1) clay; massive; flows easily between fingers when squeezed leaving hand empty; moderately alkaline; clear smooth boundary.

IIC2g—78 to 84 inches; gray (5Y 5/1) silty clay loam; massive; flows easily between fingers when squeezed leaving hand empty; moderately alkaline.

Depth to mineral material ranges from 51 inches to more than 100 inches from the surface.

The O horizon has hue of 7.5YR or 10YR, value of 2 to 4, and chroma of 1 to 3. Fiber content after rubbing is generally less than 10 percent, but thin strata of hemic or fibric material are common. The mineral content ranges from 40 to 60 percent. The organic material in the surface tier (0 to 12 inches) ranges from neutral to moderately alkaline. Reaction in the organic material in the subsurface tier (12 to 36 inches) and the bottom tier (36 to 64 inches) is mildly alkaline or moderately alkaline. The average conductivity of the saturation extract ranges from 4 to 8 millimhos per centimeter throughout the O horizon.

Some pedons have a thin IIA horizon of clay, silty clay, or silty clay loam.

The IICg horizon has hue of 5Y or 5GY, value of 4 or 5, and chroma of 1. It is clay, silty clay, or silty clay loam. Reaction is mildly alkaline or moderately alkaline. In some pedons, thin layers of organic material are within the IICg horizon.

Larose series

The Larose series consists of level, very poorly drained, very slowly permeable, semifluid mineral soils. The soils formed in thin deposits of decomposed herbaceous material over clayey alluvium. These soils are in freshwater marshes and are ponded or flooded most of the time. Elevation ranges from sea level to about 1 foot above mean sea level. Slope is less than 0.2 percent.

Soils of the Larose series are very-fine, montmorillonitic, nonacid, thermic Typic Hydraquents.

Larose soils commonly are near Allemands, Kenner, and Sharkey soils and are similar to Barbary and Scatlake soils. The Allemands and Kenner soils are in positions similar to those of Larose soils and have an organic surface layer more than 16 inches thick. The Barbary soils are in inland swamps and have stumps and logs within the profile. The Sharkey soils are in slightly higher positions than Larose soils and have a B horizon that has an *n* value of less than 0.7. The Scatlake soils are in saline marshes and are more saline than Larose soils.

Typical pedon of Larose muck, 1/2 mile east of Churchill Farms on south side of gravel road and 200 feet south of powerline, near center of sec. 17, T. 14 S., R. 23 E.

O2—0 to 4 inches; very dark brown (10YR 2/2) muck; about 18 percent fiber, 5 percent rubbed; weak coarse granular structure; flows easily between fingers when squeezed leaving large residue in hand; many fine roots; about 50 percent mineral; medium acid; abrupt smooth boundary.

A1g—4 to 16 inches; dark gray (5Y 4/1) mucky clay; about 15 to 20 percent black (10YR 2/1) slightly decomposed organic matter; massive; flows between fingers with difficulty when squeezed leaving large residue in hand; mildly alkaline; clear smooth boundary.

C1g—16 to 32 inches; gray (5Y 5/1) clay; massive; flows easily between fingers when squeezed leaving hand empty; few 1/2-inch strata containing 5 percent herbaceous fiber, less than 1 percent rubbed; mildly alkaline; gradual smooth boundary.

C2g—32 to 46 inches; gray (N 5/0) mucky clay; massive; flows easily between fingers when squeezed leaving hand empty; about 10 percent black (10YR 2/1) organic material dispersed throughout the horizon; moderately alkaline; gradual smooth boundary.

C3g—46 to 52 inches; dark gray (5Y 4/1) clay; massive; flows easily between fingers when squeezed leaving hand empty; moderately alkaline; clear smooth boundary.

Ab—52 to 76 inches; very dark grayish brown (10YR 3/2) mucky clay; massive; flows easily between fingers when squeezed leaving hand empty; about 5 percent fiber, less than 1 percent rubbed; moderately alkaline; gradual smooth boundary.

Depth to firm mineral material commonly is more than 40 inches from the surface.

The O2 horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. Thickness ranges from 2 to 15 inches. Reaction ranges from medium acid to mildly alkaline.

The A1 horizon has hue of 10YR, 2.5Y, or 5Y; value of 2 to 4; and chroma of 1 or 2, or it is neutral. It is clay, silty clay, or mucky clay. Thickness ranges from 4 to 12 inches. Reaction ranges from slightly acid to moderately alkaline. The *n* value of the A1 horizon is more than 1.

The C horizon has hue of 10YR, 5Y, 5GY, or 5BG, value of 3 to 5, and chroma of 1 or 2, or it is neutral. It is clay, silty clay, or mucky clay. Reaction ranges from slightly acid to moderately alkaline. The C horizon has an *n* value of 0.7 to more than 1 in all parts above a depth of 40 inches. In some pedons, thin layers of organic material are in the C horizon.

In some pedons, an Ab horizon is below the C horizon. It is mucky clay, clay, or silty clay.

In some pedons, there is a IIC horizon of fine sand or loamy sand at a depth of more than 40 inches.

Scatlake series

The Scatlake series consists of level, very poorly drained, very slowly permeable, saline, semifluid mineral soils. These soils are in saline marshes that are ponded or flooded most of the time. They formed mainly in clayey alluvium. Elevation ranges from sea level to about 1 foot above sea level. Slope is less than 0.5 percent.

Soils of the Scatlake series are very-fine, montmorillonitic, nonacid, thermic Typic Hydraquents.

Scatlake soils commonly are near Felicity and Timbalier soils and are similar to Barbary and Larose soils. The Barbary soils are in inland swamps and are less saline than Scatlake soils. The Felicity soils are on ridges and are firm and sandy throughout. The Larose soils are in freshwater marshes and are not so saline as Scatlake soils. The Timbalier soils are in positions similar to those of the Scatlake soils and have a thick organic surface layer.

Typical pedon of Scatlake muck, 1 mile south of Highway 1 and 1 mile north of the Gulf of Mexico, near center of sec. 25, T. 22 S., R. 24 E.

O2—0 to 6 inches; very dark gray (10YR 3/1) muck; massive; flows slowly between fingers when squeezed leaving hand empty; about 65 percent mineral; moderately alkaline; abrupt smooth boundary.

A1—6 to 14 inches; dark gray (10YR 4/1) clay; massive; flows easily between fingers when squeezed leaving hand empty; moderately alkaline; clear smooth boundary.

C1g—14 to 42 inches; dark gray (5Y 4/1) clay; massive; flows easily between fingers when squeezed leaving hand empty; moderately alkaline; clear smooth boundary.

C2g—42 to 66 inches; gray (5Y 5/1) clay; massive; flows easily between fingers when squeezed leaving hand empty; moderately alkaline.

Depth to firm mineral material commonly is greater than 40 inches. In more than half of the upper 20 inches of the profile, the electrical conductivity ranges from 8 to 16 millimhos per centimeter. The *n* value of all mineral layers above a depth of 40 inches is 1 or more. Reaction ranges from neutral to moderately alkaline throughout the soil.

Thickness of the O2 horizon ranges from 2 to 8 inches. It is muck or peat.

The A1 horizon has hue of 10YR or 5Y, value of 2 to 4, and chroma of 1, or it is neutral. It is clay or mucky clay.

The Cg horizon has hue of 10YR, 5Y, 5BG, or 5GY; value of 4 or 5; and chroma of 1, or it is neutral. In some pedons, thin layers of muck are in the Cg horizon.

Sharkey series

The Sharkey series consists of poorly drained, very slowly permeable, firm mineral soils. The soils formed in clayey alluvium. These soils are in low and intermediate positions on the natural levees of the Mississippi River and its distributaries. Elevation ranges from about 1 foot to 5 feet above sea level. Slope is less than 1 percent.

Soils of the Sharkey series are very-fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts.

Sharkey soils commonly are near Barbary, Commerce, Harahan, and Vacherie soils. The very poorly drained Barbary soils are in swamps and have an *n* value of more than 0.7. The somewhat poorly drained Commerce soils are in higher positions than Sharkey soils and are fine-silty. The Harahan soils are in slightly lower positions

than Sharkey soils and have a semifluid C horizon. The Vacherie soils are in slightly higher positions than Sharkey soils and are coarse-silty over clayey.

Typical pedon of Sharkey clay, in sec. 5, T. 13 5., R. 23 E. near intersection of canal and powerline.

A1—0 to 4 inches; dark gray (10YR 4/1) and very dark grayish brown (10YR 3/2) clay; few fine faint dark yellowish brown mottles; weak fine granular structure; firm, plastic; strongly acid; clear smooth boundary.

B21g—4 to 18 inches; dark gray (10YR 4/1) clay; few fine distinct yellowish brown mottles; strong medium angular blocky structure; firm, slightly plastic; many peds are stained with yellowish red (5YR 5/6); few slickensides 1/2 to 1 inch long; neutral; gradual smooth boundary.

B22g—18 to 43 inches; dark gray (5Y 4/1) clay; common medium faint dark brown (10YR 4/3) mottles; moderate medium angular blocky structure; firm, plastic; few short slickensides; moderately alkaline; clear smooth boundary.

Cg—43 to 60 inches; dark gray (10YR 4/1) clay; massive; firm, sticky; few woody fragments 1 to 2 inches in diameter; moderately alkaline; calcareous on faces of small cracks.

Thickness of the solum ranges from 36 to 60 inches. Cracks, 1 to 3 centimeters wide, form at a depth of 20 inches and extend upward to the surface during dry periods in most years.

The A horizon hue of 10YR, value of 3 or 4, and chroma of 1 or 2. It is clay, silty clay, or silty clay loam. Thickness of the A horizon ranges from 4 to 15 inches. Reaction ranges from strongly acid to moderately alkaline.

The B horizon has hue of 10YR or 5Y, value of 4 or 5, and chroma of 1, or it is neutral. It typically is clay, but in some pedons there are thin subhorizons of silty clay or silty clay loam. The content of clay ranges from 60 to 90 percent. Reaction ranges from medium acid to moderately alkaline.

The C horizon has the same range in colors as the B horizon. It is clay, silty clay, or silty clay loam. Reaction ranges from neutral to moderately alkaline.

Timbalier series

The Timbalier series consists of level, very poorly drained, very slowly permeable organic soils. These soils formed in thick accumulations of herbaceous plant materials. They are in saline marshes and are ponded or flooded most of the time. Elevation ranges from sea level to about 1 foot above sea level. Slope is less than 0.2 percent.

Soils of the Timbalier series are euic, thermic Typic Medisaprists.

Timbalier soils commonly are near Scatlake soils and are similar to Kenner and Lafitte soils. The Kenner soils are in freshwater marshes and contain thin strata of mineral material in the upper part of the profile. The Lafitte soils are in brackish marshes and are not so saline as Timbalier soils. The Scatlake soils are in positions similar to those of the Timbalier soils and are semifluid mineral soils.

Typical pedon of Timbalier muck, in an area of Timbalier-Scatlake association, at the southwest end of Mud Lake on the south side of pass.

Oa1—0 to 12 inches; very dark grayish brown (10YR 3/2) muck; about 25 percent fiber, 10 percent rubbed; massive; about 50 percent mineral; flows easily between fingers when squeezed leaving hand empty; moderately alkaline; gradual smooth boundary.

Oa2—12 to 24 inches; very dark grayish brown (10YR 3/2) muck; about 25 percent fiber, 2 percent rubbed; massive; flows easily between fingers when squeezed leaving hand empty; about 60 percent mineral; moderately alkaline; clear smooth boundary.

Oa3—24 to 66 inches; very dark grayish brown (10YR 3/2) muck; about 12 percent fiber, 1 percent rubbed; massive; flows easily between fingers when squeezed leaving hand empty; about 65 percent mineral; moderately alkaline; abrupt smooth boundary.

IICg—66 to 72 inches; gray (5Y 5/1) clay; massive; flows easily between fingers when squeezed leaving hand empty; moderately alkaline.

Depth to the clayey mineral layer ranges from 51 to 100 inches or more. Reaction ranges from neutral to moderately alkaline in the surface tier and from slightly acid to moderately alkaline in the lower tiers. Reaction is mildly alkaline or moderately alkaline in the IICg horizon. Conductivity of the saturation extract ranges from 8 to 16 millimhos per centimeter in some layers within a depth of 40 inches. Mineral content in the organic material ranges from 30 to 70 percent.

The surface tier (0 to 12 inches) has hue of 10YR or 7.5YR, value of 2 to 4, and chroma of 1 to 3. The rubbed content of fiber ranges from 1 to 35 percent. In some pedons, an overwash of mineral material on the surface ranges in thickness from 2 to 16 inches.

The subsurface tier (12 to 36 inches) and bottom tier (36 to 64 inches) have hue of 7.5YR or 10YR, value of 1 to 3, and chroma of 1 to 3. The rubbed content of fiber ranges from 1 to 10 percent of the organic volume.

The IICg horizon has hue of 5Y, 5BG, 5G, or 5GY; value of 4 to 6; and chroma of 1, or it is neutral. It is semifluid clay or silty clay. In some pedons, thin layers of silt loam, fine sand, and organic material are within the IICg horizon.

Vacherie series

The Vacherie series consists of gently undulating, somewhat poorly drained, very slowly permeable soils. The soils formed in loamy alluvium over clayey alluvium. These soils are in intermediate positions on the natural levees of the Mississippi River and its distributaries. Elevation ranges from about 1 to 8 feet above sea level. Slope ranges from 0 to 3 percent.

Soils of the Vacherie series are coarse-silty over clayey, mixed, nonacid, thermic Aeric Fluvaquents.

Vacherie soils commonly are near Commerce and Sharkey soils. The Commerce soils are in positions similar to those of the Vacherie soils and are loamy throughout. The Sharkey soils are in the low positions on natural levees and are clayey throughout.

Typical pedon of Vacherie silt loam, gently undulating, 3 miles northwest of Avondale, 2,000 feet northeast of Waggaman Pond, and 1,100 feet southwest of railroad, sec. 8, T. 13 5., R. 9 E.

A11—0 to 2 inches; dark grayish brown (10YR 4/2) silt loam; weak fine granular structure; friable; many fine roots; slightly acid; clear smooth boundary.

A12—2 to 9 inches; dark grayish brown (10YR 4/2) silt loam; weak coarse subangular blocky structure; friable; patchy dark reddish brown stains on large peds; mildly alkaline; clear wavy boundary.

B21—9 to 16 inches; grayish brown (10YR 5/2) silt loam; weak medium subangular blocky structure; stains on surface of peds; mildly alkaline; gradual smooth boundary.

B22—16 to 28 inches; grayish brown (10YR 5/2) silt loam; common fine faint dark brown mottles; massive; matrix fractures irregularly into 3- to 6-inch diameter blocks; firm; dark reddish brown stains on vertical faces of peds; few areas at the base of horizon have thin platy structure; moderately alkaline; abrupt wavy boundary.

IIAb—28 to 40 inches; dark gray (10YR 4/1) clay; massive; very firm; yellowish red stains adjacent to roots; moderately alkaline; abrupt wavy boundary.

IIBb—40 to 60 inches; gray (5Y 5/1) silt clay; weak medium subangular blocky structure; sticky and plastic; few woody fragments; moderately alkaline.

Thickness of the loamy part of the solum ranges from 20 to 36 inches.

The A horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2, or it is neutral. It is silt loam or very fine sandy loam and ranges in thickness from 4 to 16 inches. The reaction ranges from medium acid to moderately alkaline.

The B horizon has hue of 10YR or 2.5Y, value of 4 or 5, and chroma of 1 or 2. It is silt loam or very fine sandy loam. The content of fine sand and coarser sand ranges from 3 to 15 percent. The content of clay ranges from 10 to 18 percent. Reaction ranges from slightly acid to moderately alkaline.

The IIA and IIB horizons have hue of 10YR, 2.5Y, or 5Y; value of 4 or 5; and chroma of 1, or it is neutral. Reaction ranges from neutral to moderately alkaline.

Westwego series

The Westwego series consists of level, poorly drained, very slowly permeable soils. These soils formed in semifluid clayey alluvium and decomposed organic material. The upper part of the profile has dried and cracked irreversibly as the result of artificial drainage. These soils are in broad, drained, former swamps in the delta of the Mississippi River. They are protected from flooding by a system of levees and drained by pumps. Elevation ranges from about 1 foot above sea level to about 3 feet below sea level. Slope is less than 0.5 percent.

Soils of the Westwego series are very-fine, montmorillonitic, nonacid, thermic, cracked Thapto-Histic Fluvaquents.

Westwego soils commonly are near Commerce, Harahan, and Sharkey soils. The Commerce and Sharkey soils are in higher positions than Westwego soils and have an *n* value of less than 0.7 throughout. The Harahan soils are in positions similar to those of Westwego soils and do not have thick organic layers within the control section.

Typical pedon of Westwego clay, in Avondale Subdivision, 400 feet south of the intersection of Janet and Ruth Streets, sec. 43, T. 14 S., R. 22 E.

A1—0 to 3 inches; very dark gray (10YR 3/1) clay; few fine faint yellowish brown mottles; weak medium subangular blocky structure parting to moderate fine granular; friable; medium acid; abrupt wavy boundary.

B21g—3 to 8 inches; dark gray (10YR 4/1) clay; common medium faint dark yellowish brown (10YR 4/4) mottles; weak coarse subangular blocky structure; firm; common cracks as wide as 1 centimeter; root channels coated with very dark gray muck; medium acid; abrupt wavy boundary.

B22g—8 to 15 inches; dark gray (N 4/0) clay; weak coarse prismatic structure; firm; root channels stained with dark brown; common cracks as wide as 1 centimeter between prisms; very strongly acid; abrupt wavy boundary.

Abg—15 to 17 inches; black (N 2/0) mucky clay; weak moderate subangular blocky structure; firm; common cracks as wide as 1 centimeter; very strongly acid; abrupt wavy boundary.

B23bg—17 to 21 inches; dark gray (5Y 4/1) clay; common fine distinct dark yellowish brown mottles on faces of peds and in root channels; moderate coarse prismatic structure; firm; cracks between prisms as wide as 2 centimeters; strongly acid; abrupt wavy boundary.

IIO2bg—21 to 36 inches; black (N 2/0) muck; massive; firm; about 65 percent mineral; about 10 percent fiber, less than 1 percent rubbed; medium acid; abrupt wavy boundary.

IIIC1bg—36 to 68 inches; dark gray (5Y 4/1) clay; few coarse prominent dark yellowish brown (10YR 4/4) mottles; massive; flows easily between fingers when squeezed leaving small residue; many strata of dark gray (N 4/0) clay about 1 to 5 millimeters thick; few stumps, logs, and wood fragments; moderately alkaline; abrupt smooth boundary.

IIIC2bg—68 to 80 inches; stratified dark gray (5Y 4/1) clay and very dark brown (10YR 2/2) mucky clay; massive; flows easily between fingers when squeezed leaving hand empty; few stumps, logs, and wood fragments; moderately alkaline.

Depth to semifluid layers ranges from 28 to 40 inches. Depth to an organic layer more than 8 inches thick ranges from 20 to 40 inches. Reaction of the A, B, and O horizons ranges from very strongly acid to slightly acid. Reaction of the IIICbg horizon ranges from neutral to moderately alkaline.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2, or it is neutral. It is clay, silty clay, mucky clay, or muck and ranges in thickness from 2 to 7 inches.

The Bg and Bbg horizons have hue of 10YR, 2.5Y, 5Y, 5BG, 5GY, or 5G; value of 2 to 5; and chroma of 1, or they are neutral. They are clay, silty clay, or mucky clay.

The Ab horizon, where present, has hue of 10YR or 5Y, value of 2 or 3, and chroma of 1, or it is neutral. It is clay or mucky clay.

The O horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2, or it is neutral. It consists of sapric, hemic, or fibric material.

The IIICbg horizon has hue of 10YR, 2.5Y, 5Y 5BG, 5GY, or 5G; value of 2 to 5; and chroma of 1 or 2. It is clay or mucky clay.

Formation of the soils

By Bobby J. Miller, Department of Agronomy, Agricultural Experiment Station, Louisiana State University

This section explains the processes and factors of soil formation and relates them to the soils in the survey area.

Factors of soil formation

Soils are natural, three-dimensional bodies that formed on the earth's surface. They have properties resulting from the integrated effect of climate and living matter acting on parent material as conditioned by relief over periods of time.

The interaction of five main factors influences the processes of soil formation and results in differences among the soils. These factors are the climate under which the soil material has accumulated; the physical and chemical composition of the parent material; the kind of plants and other organisms living in and on the soil; the relief of the land and its effect on runoff and soil temperature and moisture conditions; and the length of time it took the soil to form.

The effect of any one factor can differ from place to place, but the interaction of all the factors determines the kind of soil that forms. Many of the differences in soils cannot be attributed to differences in the effects of only one factor. For example, the organic matter content in the soils of Jefferson Parish is influenced by several factors: relief, parent material, and living organisms. The following paragraphs describe the factors of soil formation as they relate to soils in the survey area.

Climate

Jefferson Parish has the subtropical, humid climate that is characteristic of areas near the Gulf of Mexico. The warm, moist climate has promoted rapid soil formation. Climate is uniform throughout the parish, although its effect is modified locally by relief. The minor climate differences within the parish are not considered significant enough to create soil differences. Detailed information about climate is given in the section "General nature of the parish."

Living organisms

Living organisms, including plants, bacteria, fungi, and animals, are important in the formation of soils. Among the chemical and physical changes they cause are gains in content of plant nutrients and changes in structure and porosity. Plant roots force openings into the soil and modify porosity. As they grow, they break up and rearrange the soil particles. Plants transfer nutrients from the subsoil to the surface layer, and when they die, plant tissue supplies organic matter to the soils. Bacteria and other microorganisms decompose organic matter and help improve the physical condition of the soil. Animals, such as crawfish and earthworms, also influence soil formation by mixing the soil. When animals die, they too decompose and enrich the soil with organic matter and nutrients.

Man's activities such as cultivating, fertilizing, channel constructing, harvesting, burning, draining, diking, flooding, and land smoothing affect the soil. Some soils of Jefferson Parish have been changed significantly by man's activities. Examples include the drained areas of the Allemands and Kenner soils. The native vegetation and the associated complex communities of bacteria and fungi generally have had a greater influence on soil formation in this parish than other living organisms.

The soils of the natural levees along streams formed under bottom land hardwood forest vegetation.

Soils of the marsh formed under grass and sedge vegetation (*6*). The thick layers of organic material of Kenner soils accumulated in freshwater. As the land surface subsided, the area was flooded with freshwater from rains and runoff. Maidencane, alligatorweed, bulltongue, cattail, and southern wildrice were some of the freshwater marsh plants that formed the organic material. The buildup of organic material kept pace with subsidence. However, further land subsidence and sea level rise introduced seawater over the area (*5*). With the change in salinity, brackish marsh types of vegetation became established, namely, marshhay cordgrass, coastal waterhyssop, dwarf spikerush, and Olney bulrush. The Clovelly and Lafitte soils formed in the organic material accumulated in areas that are now brackish.

Further flooding by saline seawater, in areas near the Gulf coast, changed the vegetation to the saline marsh type. Saltwort, needlegrass rush, smooth cordgrass, and Virginia samphire are some of the plants of the saline marsh. The Timbalier soils formed mostly in the residue left by these plants.

Parent material

Parent material is the initial material from which soil forms. It affects the chemical and mineralogical composition of the soils. It also influences the degree of leaching, the reaction, texture, permeability, and drainage, and the kind and color of the surface and subsoil layers. Textural differences in parent material are accompanied by differences in chemical and mineral composition. In general, soils that form in loamy and sandy parent material have a lower capacity to hold nutrients that those that form in clay.

The soils in Jefferson Parish formed in alluvial and marine sediments and accumulations of organic material.

The alluvium is from distributary streams of present and former deltas of the Mississippi River (*8*). Bordering the stream channels are low ridges called natural levees. These levees are highest next to the channels and slope gradually away from it. The levees are shaped by waters that overspread the streambanks (*7*). When the water slows, it first drops sand, then silt, and finally clay particles. Thus, the soils on the higher parts of natural levees formed in loamy material that has a moderate sand content. These soils are generally lighter colored, more permeable, and better drained than the soils on the lower part and beyond the natural levees. Examples are Commerce and Vacherie soils. On the lower part of the natural levees and beyond the natural levees in the backswamps are the clayey sediments that were dropped from slowly moving water. Sharkey soils formed in this type of material. The Larose and Scatlake soils also formed in clayey alluvium, but they contain some marine sediment.

The Felicity soils formed in sandy material on former beach ridges deposited by the wave action of the sea.

Organic material accumulates in areas that are saturated or flooded with water. Water prevents the complete oxidation and decomposition of the plant residue. Water, vegetation, and time coupled with a rise in sea level and a land subsidence created the conditions in which thick layers of organic material accumulated in the marshes of Jefferson Parish. The buildup of organic material kept pace with land subsidence and sea level rise. The Kenner and Lafitte soils formed in thick accumulations of herbaceous organic material. The Allemands and Clovelly soils formed in moderately thick accumulations of herbaceous organic material over clayey alluvium.

Relief

Relief and other physiographic features influence soil formation processes mainly by affecting internal soil drainage, runoff, erosion and deposition, salinity levels, and exposure to the sun and wind. In Jefferson Parish, sediment has accumulated at a much faster rate than it has eroded away. This accumulation of sediment has been faster than the rate of many of the processes of soil formation. This is shown in the distinct stratification in lower horizons of some soils. Levee construction and other water control measures may have reversed this trend for such soils as the Commerce soils. Soil slope and rate of runoff, however, are low enough to prevent erosion from being a major problem in the parish.

The land surface of the parish is level or nearly level. The slope is less than 1 percent, except on sandy ridges near the Gulf of Mexico where the slope is as much as 3 percent. Relief and the landscape position have had an important influence on formation of the different soils. Characteristically, the slopes are long and extend from the highest elevation on natural levees along the Mississippi River and bayous or distributary channels to an elevation that is several feet lower in the swamps and marshes.

Differences in the Commerce, Sharkey, and Allemands soils illustrate the influence of relief on the soils in the parish. Commerce soils are on the highest elevation, contain the least amount of clay, and have the best natural drainage. Sharkey soils are on the lower parts of the natural levees, have a high content of clay, and are poorly drained. Allemands soils, which are in the lower positions, are very poorly drained and are ponded most of the time unless they are artificially drained. These soils have a thick organic surface layer—the result of accumulations of decaying vegetation—and clayey underlying material. If the Allemands soils are drained, their elevation is as low as 5 feet below sea level because of subsidence.

The dominant soils are the Commerce and Sharkey soils at the highest elevations and Allemands and Kenner soils in swamps and marshes at the lowest elevations (fig. 8). Soils at the lower elevations receive runoff from those at the higher elevations, and the water table is nearer the surface for longer periods in the soils at lower elevations. Differences in the organic matter content of the soils are related to the internal drainage of the soils, which is related to relief. The content of organic matter generally increases as internal soil drainage becomes more restricted. Such soils as the Commerce soils, in the higher and better drained positions, have an environment in which more extensive oxidation of organic matter takes place. The very poorly drained Allemands and Kenner soils are ponded for extended periods, which results in a more limited environment and in a greater accumulation of organic matter.

The relief factor in the parish is somewhat unique because the soils are on a low-lying, slowly subsiding landmass. Geologic investigations indicate that the overall area is very slowly decreasing in elevation (*3*). Present elevation of undrained soils ranges from sea level to a maximum of approximately 12 feet above sea level. The subsidence can be attributed partly to the

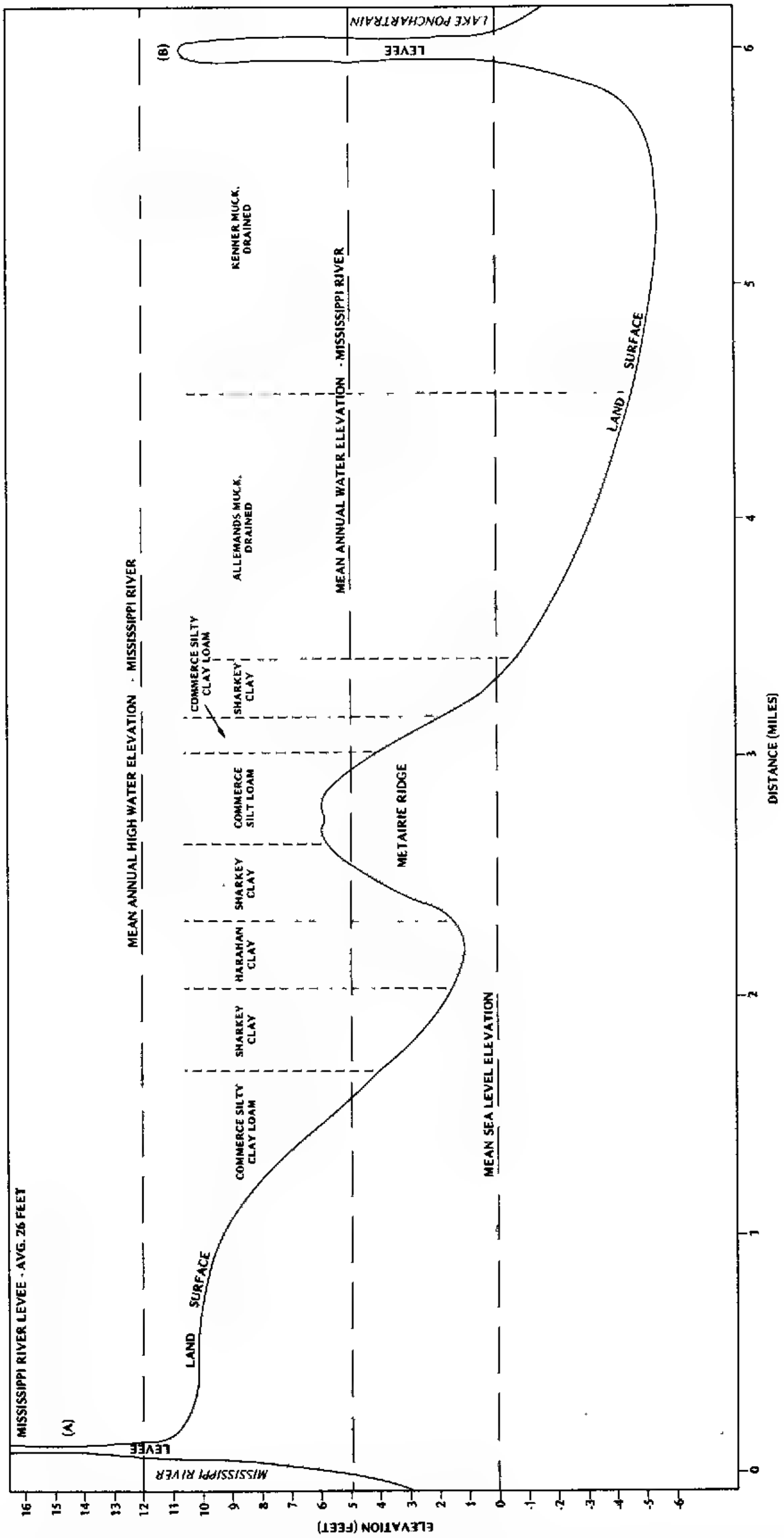


Figure 8.—Transect showing relationship of soils to surface elevation from Mississippi River levee at Harahan (A) to Lake Pontchartrain levee at intersection of Clearview Parkway and Folse Street (B).

continued accumulation in the Gulf of Mexico of sediment from the Mississippi River and lesser sources. The added weight of this sediment results in a continuous downwarping of the adjoining landmass. This process causes a general lowering of the landmass and an increase in the regional gulfward slope. In addition, post-depositional sediment compaction may result in some subsidence, and local deposition of sediment may contribute to similar but more localized changes.

Some possible effects of this natural geologic subsidence are apparent. For example, some soils that were subject only to intermittent flooding are now flooded more frequently and are covered with deeper water for longer periods. Some of the soils on natural levees along distributary channels have subsided to an elevation below sea level and are now covered with water most of the time. As the soils subside, seawater moves landward with each increment of subsidence. Consequently, some soils that were formerly in freshwater marshes are now in brackish or saline marshes.

Subsidence and the resulting intrusions of saltwater are accelerated by some of man's activities. Artificial drainage can cause organic soils to subside several feet in a short time. In addition, ditches and channels dug for drainage or navigation purposes create courses for seawater to intrude inland for great distances.

The resulting increase in soil and water salinity has a marked effect on marsh and swamp vegetation. The less salt-tolerant vegetation is quickly replaced by more salt-tolerant vegetation. In addition, numbers and species of fish and crustaceans in any given area change dramatically as salinity of the soil and water increases.

In many areas, natural and accelerated subsidence have lowered the elevation to such an extent that only lakes and ponds exist where land once was visible.

Time

The kinds of horizons and their degree of development within a soil are influenced by the length of time of soil formation. Long periods are generally required for soils to form prominent horizons.

In general, the soils of Jefferson Parish are young; time has been too short for distinct horizons to develop. However, such soils as Commerce, Sharkey, and Vacherie soils on the natural levees of streams have been influenced by soil-forming processes long enough to develop faintly differentiated horizons. Evidence of development is darkening of the A horizon by organic matter and a weakly developed B horizon. These soils developed in alluvium about 2,000 years old (*8*).

The youngest soils in the parish have little, if any, profile development. For example, in Felicity soils neither a darkened A horizon nor a B horizon has developed. The Allemands and Clovelly soils are also young and show little evidence of profile development. These soils, in the marshes, are forming in recent accumulations of herbaceous organic material and alluvium.

Processes of soil formation

The processes of soil formation influence the kind and degree of development of soil horizons. The factors of soil formation—climate, living organisms, relief, parent material, and time—determine the rate and relative effectiveness of the different processes.

Important soil-forming processes are those that result in (1) additions of organic, mineral, and gaseous materials to the soil; (2) losses of these same materials from the soil; (3) translocation of materials from one point to another within the soil; and (4) physical and chemical transformation of mineral and organic material within the soil (*9*).

Many processes occur simultaneously, for example, the accumulation of organic matter, the development of soil structure, and the leaching of bases from some soil horizons. The contribution of a particular process may change over a period of time. The installation of drainage and water control systems, for example, can change the length of time some soils are flooded or saturated with water. Some important processes that have contributed to the formation of the soils in Jefferson Parish are discussed in the following paragraphs.

Organic matter has accumulated, has partly decomposed, and has been incorporated in all the soils. The organic accumulations range from the humus in mineral horizons of the Commerce and Sharkey soils to the organic horizons, muck, of the Allemands and Barbary soils in the marshes and swamps. Because most of the organic matter is produced in and above the surface layer, the surface layer is higher in organic matter content than the deeper horizons. Living organisms decompose, incorporate, and mix organic residues into the soil. Some of the more stable products contribute to darker colors, increased water-holding and cation-exchange capacities, and granulation of the soil.

Processes resulting in development of soil structure have occurred in most of the mineral soils. Plant roots and other organisms contribute to the rearrangement of soil material into secondary aggregates. The decomposition products of organic residue and the secretions of organisms serve as cementing agents that help stabilize structural aggregates. Alternate wetting and drying as well as shrinking and swelling contribute to the development of structural aggregates and are particularly effective in soils that have appreciable amounts of clay. Consequently, soil structure is typically most pronounced in the surface horizon, which contains the most organic matter, and in clayey horizons that alternately undergo wetting and drying.

Most of the soils mapped in the parish have horizons in which reduction of iron and manganese compounds is

an important process. Reducing conditions prevail for long periods in poorly aerated horizons. Consequently, the relatively soluble reduced forms of iron and manganese predominate over the less soluble oxidized forms. The reduced compounds of these elements produce the gray colors in the Bg and Cg horizons that are characteristic of many of the soils. In the more soluble reduced form, appreciable amounts of iron and manganese can be removed from the soils or translocated from one position to another within the soil by water. Reduced forms of iron and manganese not removed can be reoxidized upon development of oxidizing conditions in the soil. The presence of gray and yellowish or reddish mottles indicates alternating oxidizing and reducing conditions in many of the soils.

Water moving through the soil has leached many soluble components, including any free carbonates that may have been present initially, from the upper horizon of some of the mineral soils in the parish. The carbonates and other more readily soluble salts have been mostly leached from the soil or moved to lower horizons in the better drained, loamy soils, such as Commerce soils. In general, the permanently wet soils of the marshes and swamps have rarely been leached. However, areas of organic soils are readily leached during unusual and extended dry periods or when these soils are artificially drained.

References

(1) American Association of State Highway [and Transportation] Officials. 1970. Standard specifications for highway materials and methods of sampling and testing. Ed. 10, 2 vol., illus.

(2) American Society for Testing and Materials. 1974. Method for classification of soils for engineering purposes. ASTM Stand. D 2487–69. *In* 1974 Annual Book of ASTM Standards, Part 19, 464 pp., illus.

(3) Charbreck, Robert H. 1972. Vegetation, water, and soil characteristics of Louisiana. Louisiana Agricultural Experiment Station Bulletin 664, 72 pp., illus.

(4) Earle, D. W. 1975. Land subsidence problems and maintenance costs to homeowners in east New Orleans, Louisiana. Ph. D. Dissertation, Louisiana State University Library, Baton Rouge, Louisiana.

(5) Morgan, James P. 1972. Impact of subsidence and erosion on Louisiana coastal marshes and estuaries. Louisiana State University, Department of Geology, 17 pp., illus.

(6) Palmisano, A. W. and Robert H. Charbreck. 1972. The relationship of plant communities and soils of the Louisiana coastal marshes. 13th Annual Meeting, Louisiana Association of Agronomist, 42 pp.

(7) Russell, Richard Joel. 1939. Louisiana stream patterns. American Association of Petroleum Geologists Bulletin, Vol. 23 (8), pp. 1199-1227, illus.

(8) Saucier, Roger T. 1974. Quaternary geology of the Lower Mississippi Valley. Arkansas Archgeological Survey Resources Series, No. 6., 26 pp.

(9) Simonson, R. W. 1959. Outline of a generalized theory of soil genesis. Soil Scientist Society of America Proceedings 23:152-156.

(10) United States Department of Agriculture. 1903. Soil survey of the New Orleans area, Louisiana. Bureau of Soils, 20 pp., illus.

(11) United States Department of Agriculture. 1951. Soil survey manual. U.S. Department of Agriculture Handbook 18, 503 pp., illus. [Supplements replacing pp. 173-188 issued May, 1962]

(12) United Stated Department of Agriculture. 1970. Soil survey of portions of Jefferson, Orleans, St. Bernard Parishes, Louisiana. Soil Conservation Service, Louisiana. 124 pp., illus.

(13) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conservation Service, U.S. Department of Agriculture Handbook 436, 754 pp., illus.

(14) United States Department of Agriculture. 1976. Gulf coast wetlands handbook. Soil Conservation Service, Louisiana. 50 pp., illus.

(15) United States Department of Agriculture. 1977. Soil survey of the east bank of Jefferson Parish, Louisiana. Soil Conservation Service, Louisiana. 75 pp., illus.

(16) United States Department of Agriculture. 1978. Soil survey of the west bank of Jefferson Parish, Louisiana. Soil Conservation Service, Louisiana. 101 pp., illus.

(17) United States Department of Interior. 1966. Ground water resources of the Greater New Orleans area. By J. R. Rollo, Geological Survey, Louisiana Department of Public Works, Baton Rouge, Louisiana.

(18) United States Department of Interior. 1970. Public water supplies in Louisiana. By Don C. Dial, Geological Survey, Louisiana Department of Public Works, Baton Rouge, Louisiana, Basic Records Report No. 3.

(19) United States Department of Interior. 1971. Chemical, biological, and physical data for the major dikes and reservoirs in Louisiana. By Wm. J. Samprine, Geological Survey, Louisiana Department of Public Works, Baton Rouge, Louisiana.

Glossary

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Association, soil. A group of soils geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine stratifications, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediments.

Bottom land. The normal flood plain of a stream, subject to flooding.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Coarse textured soil. Sand or loamy sand.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, for example, fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Fine textured soil. Sandy clay, silty clay, and clay.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.20 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Salty water (in tables.) Water that is too salty for consumption by livestock.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow intake (in tables). The slow movement of water into the soil.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded 1955-77 at New Orleans, Louisiana]

Month	Temperature						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[1]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January----	61.5	42.6	52.0	81	19	186	4.73	2.06	6.89	6	.0
February---	64.8	44.7	54.8	82	25	207	5.23	2.99	7.04	6	.1
March------	71.1	51.3	61.2	84	31	361	4.66	1.82	6.96	6	.0
April------	78.6	58.8	68.7	88	39	561	3.90	1.29	5.97	5	.0
May--------	84.4	65.1	74.8	92	50	769	5.01	2.27	7.23	6	.0
June-------	89.0	70.4	79.7	95	58	891	4.89	2.52	6.83	7	.0
July-------	90.4	73.1	81.8	97	67	986	6.25	4.42	7.94	10	.0
August-----	89.5	72.7	81.1	96	64	964	6.19	3.20	8.63	9	.0
September--	86.3	69.6	78.0	94	56	840	6.32	2.83	9.16	7	.0
October----	79.2	59.0	69.1	90	40	592	2.84	.98	4.34	4	.0
November---	70.1	49.9	60.0	84	30	310	3.94	1.15	6.19	6	.0
December---	64.2	44.9	54.6	82	23	199	5.39	3.28	7.27	7	.1
Yearly:											
Average--	77.4	58.5	68.0	---	---	---	---	---	---	---	---
Extreme--	---	---	---	97	19	---	---	---	---	---	---
Total----	---	---	---	---	---	6,866	59.35	48.45	69.71	79	.2

[1]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (50° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

[Recorded 1955-77 at New Orleans, Louisiana]

Probability	Temperature		
	24° F or lower	28° F or lower	32° F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	February 10	February 26	March 25
2 years in 10 later than--	February 1	February 17	March 15
5 years in 10 later than--	January 8	January 30	February 25
First freezing temperature in fall:			
1 year in 10 earlier than--	December 16	November 22	November 13
2 years in 10 earlier than--	December 28	December 2	November 20
5 years in 10 earlier than--	January 31	December 22	December 5

TABLE 3.--GROWING SEASON

[Recorded 1955-77 at New Orleans, Louisiana]

Probability	Length of growing season if daily minimum temperature is--		
	Higher than 24° F	Higher than 28° F	Higher than 32° F
	Days	Days	Days
9 years in 10	326	281	245
8 years in 10	340	294	258
5 years in 10	>365	322	282
2 years in 10	>365	>365	306
1 year in 10	>365	>365	319

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Allemands muck, drained	6,927	1.7
2	Allemands muck	6,400	1.5
3	Harahan clay	4,746	1.1
4	Barbary muck	10,991	2.7
6	Commerce silty clay loam	5,831	1.4
7	Commerce and Sharkey soils, frequently flooded	980	0.2
8	Kenner muck	26,980	6.5
11	Kenner muck, drained	10,850	2.6
13	Sharkey clay	16,700	4.0
14	Sharkey silty clay loam	4,101	1.0
16	Vacherie silt loam, gently undulating	1,878	0.5
17	Commerce silt loam	10,948	2.6
18	Larose muck	679	0.2
20	Westwego clay	10,465	2.5
22	Scatlake muck	10,408	2.5
23	Felicity loamy fine sand, occasionally flooded	4,840	1.2
24	Timbalier-Scatlake association	16,683	4.0
25	Lafitte-Clovelly association	86,009	20.7
	Large water areas	178,944	43.1
	Total	415,360	100.0

TABLE 5.--YIELDS PER ACRE OF HAY AND PASTURE PLANTS

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Common bermudagrass	Improved bermudagrass	Tall fescue and white clover	Dallisgrass and white clover
	AUM*	AUM*	AUM*	AUM*
1 Allemands	10.3	---	11.9	8.7
2 Allemands	---	---	---	---
3 Harahan	7.0	9.5	10.9	9.6
4 Barbary	---	---	---	---
6 Commerce	7.5	12.9	12.5	11.0
7 Commerce and Sharkey	---	---	---	---
8 Kenner	---	---	---	---
11 Kenner	10.0	---	11.0	8.5
13, 14 Sharkey	6.5	10.3	11.5	9.6
16 Vacherie	8.0	12.9	10.9	11.0
17 Commerce	9.0	15.5	11.5	11.0
18 Larose	---	---	---	---
20 Westwego	6.0	7.5	9.0	9.0
22 Scatlake	---	---	---	---
23 Felicity	---	---	---	---
24:**				
Timbalier	---	---	---	---
Scatlake	---	---	---	---
25:**				
Lafitte	---	---	---	---
Clovelly	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available]

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Management concerns: Equipment limitation	Management concerns: Seedling mortality	Potential productivity: Common trees	Potential productivity: Site index	Trees to plant
4 Barbary	4w6	Slight	Severe	Severe	Baldcypress	---	Baldcypress.
					Water tupelo	60	
					Black willow	---	
6 Commerce	1w5	Slight	Moderate	Slight	Green ash	80	Eastern cottonwood, American sycamore.
					Eastern cottonwood	120	
					Nuttall oak	90	
					Water oak	110	
					Pecan	---	
					American sycamore	---	
					Sweetgum	---	
7:*							
Commerce	1w5	Slight	Moderate	Slight	Green ash	80	Eastern cottonwood, American sycamore.
					Eastern cottonwood	120	
					Nuttall oak	90	
					Water oak	110	
					Pecan	---	
					American sycamore	---	
Sharkey	3w6	Slight	Severe	Severe	Green ash	---	Eastern cottonwood.
					Eastern cottonwood	---	
					Overcup oak	---	
					Black willow	---	
13, 14 Sharkey	2w6	Slight	Severe	Moderate	Green ash	85	Eastern cottonwood, American sycamore.
					Eastern cottonwood	100	
					Cherrybark oak	90	
					Sweetgum	90	
					Water oak	---	
					Pecan	---	
					American sycamore	---	
16 Vacherie	1w5	Slight	Moderate	Slight	Green ash	---	Eastern cottonwood, American sycamore.
					Eastern cottonwood	120	
					Sweetgum	110	
					American sycamore	---	
					Pecan	---	
17 Commerce	1w5	Slight	Moderate	Slight	Green ash	80	Eastern cottonwood, American sycamore.
					Eastern cottonwood	120	
					Nuttall oak	90	
					Water oak	110	
					Pecan	---	
					American sycamore	---	
					Sweetgum	---	

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1 Allemands	Severe: flooding, percs slowly, excess humus.	Severe: excess humus, percs slowly.	Severe: excess humus, percs slowly.	Severe: excess humus.	Severe: excess humus.
2 Allemands	Severe: flooding, ponding, percs slowly.	Severe: ponding, excess humus, percs slowly.	Severe: flooding, excess humus, ponding.	Severe: ponding, excess humus.	Severe: flooding, ponding, excess humus.
3 Harahan	Severe: wetness, percs slowly, flooding.	Severe: too clayey, excess humus, percs slowly.	Severe: too clayey, excess humus, wetness.	Severe: too clayey, excess humus.	Severe: too clayey.
4 Barbary	Severe: flooding, ponding, percs slowly.	Severe: ponding, excess humus, percs slowly.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.
6 Commerce	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.
7:*					
Commerce	Severe: flooding.	Moderate: flooding, wetness, percs slowly.	Severe: flooding.	Severe: erodes easily.	Severe: flooding.
Sharkey	Severe: flooding, wetness, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness, flooding.	Severe: wetness, too clayey.	Severe: wetness, flooding, too clayey.
8 Kenner	Severe: flooding, percs slowly, excess humus.	Severe: ponding, excess humus, percs slowly.	Severe: flooding, excess humus, percs slowly.	Severe: ponding, excess humus.	Severe: flooding, ponding, excess humus.
11 Kenner	Severe: flooding, percs slowly, excess humus.	Severe: excess humus, percs slowly.	Severe: excess humus, percs slowly.	Severe: excess humus.	Severe: excess humus.
13 Sharkey	Severe: wetness, percs slowly, flooding.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey, wetness.	Severe: wetness, too clayey.	Severe: wetness, too clayey.
14 Sharkey	Severe: wetness, percs slowly, flooding.	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.
16 Vacherie	Severe: wetness, percs slowly.	Severe: percs slowly.	Severe: wetness, percs slowly.	Severe: erodes easily.	Moderate: wetness.
17 Commerce	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Moderate: wetness.	Severe: erodes easily.	Moderate: wetness.

See footnote at end of table.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
18 Larose	Severe: flooding, percs slowly, too clayey.	Severe: flooding, too clayey, percs slowly.	Severe: excess humus, flooding, percs slowly.	Severe: ponding, too clayey, excess humus.	Severe: flooding, ponding, excess humus.
20 Westwego	Severe: flooding, wetness, percs slowly.	Severe: too clayey, percs slowly.	Severe: wetness, too clayey, percs slowly.	Severe: too clayey.	Severe: too clayey.
22 Scatlake	Severe: flooding, ponding, percs slowly.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: excess salt, ponding, flooding.
23 Felicity	Severe: flooding, too sandy, excess salt.	Severe: too sandy, excess salt.	Severe: too sandy, excess salt.	Severe: too sandy.	Severe: excess salt, droughty.
24:*					
Timbalier	Severe: ponding, excess humus, excess salt.	Severe: ponding, excess humus, excess salt.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus, flooding.	Severe: excess salt, ponding, excess humus.
Scatlake	Severe: flooding, ponding, percs slowly.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: excess salt, ponding, flooding.
25:*					
Lafitte	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus, excess salt.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: excess salt, ponding, flooding.
Clovelly	Severe: flooding, ponding, percs slowly.	Severe: ponding, excess humus, percs slowly.	Severe: flooding, excess humus, ponding.	Severe: ponding, flooding, excess humus.	Severe: flooding, ponding, excess humus.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--NATIVE PLANTS ON SELECTED SOILS IN MARSHES

Soil series	Type of marsh	Scientific name	Common name
Scatlake	Saline	Ammannia latifolia	Ammannia
Timbalier		Avicennia nitida	Black-mangrove
		Batis maritima	*Saltwort
		Borrichia frutescens	*Bushy sea-oxeye
		Croton punctatus	Gulf croton
		Distichlis spicata	*Seashore saltgrass
		Ipomoea stolonifera	Beach morningglory
		Iva frutescens	Bigleaf sumpweed
		Juncus roemerianus	*Needlegrass rush
		Salicornia virginica	*Virginia samphire
		Spartina alterniflora	*Smooth cordgrass
		Spartina patens	*Marshhay cordgrass
Clovelly	Brackish	Amaranthus cuspidata	Southern waterhemp
Lafitte		Aster tenuifolius	Saline aster
		Bacopa monnieri	*Coastal waterhyssop
		Cuscuta indecora	Bigseed alfalfa dodder
		Cyperus odoratus	Fragrant flatsedge
		Echinochloa walteri	Coast cockspur
		Eleocharis parvula	*Dwarf spikerush
		Eleocharis sp.	Spikesedge
		Heliotropium curassavicum	Salt heliotrope
		Hibiscus lasiocarpus	Woolly rosemallow
		Ipomoea sagittata	*Saltmarsh morningglory
		Kosteletzkya virginica	Virginia saltmarsh mallow
		Leptochloa fasciculatus	Bearded sprangletop
		Lythrum lineare	Wand lythrum
		Myriophyllum spicatum	Water milfoil
		Panicum amarulum	Shoredune panicum
		Paspalum vaginatum	Seashore paspalum
		Phragmites communis	Common reed
		Pluchea camphorata	Camphor pluchea
		Potamogeton pectinatus	Sago pondweed
		Ruppia maritima	Widgeongrass
		Scirpus olneyi	*Olney bulrush

*The dominant or most common plants.

TABLE 8.--NATIVE PLANTS ON SELECTED SOILS IN MARSHES--Continued

Soil series	Type of marsh	Scientific name	Common name
Clovelly	Brackish	Scirpus robustus	Saltmarsh bulrush
Lafitte		Sesbania exaltata	Hemp sesbania
		Spartina cynosuroides	Big cordgrass
		Spartina patens	*Marshhay cordgrass
		Vigna luteola	Hairypod cowpea
Allemands	Freshwater	Acer rubrum drummondii	Drummond maple
Kenner		Alteranthera philoxeroides	*Alligatorweed
Larose		Ambrosia trifida	Giant ragweed
		Andropogon glomeratus	Bushy bluestem
		Axonopus affinis	Common carpetgrass
		Baccharis halimifolia	Eastern baccharis
		Bacopa caroliniana	Carolina waterhyssop
		Carex sp.	Sedge
		Cephalanthus occidentalis	Common buttonbush
		Cerotophyllum demersum	Coontail
		Cirsium sp.	Thistle
		Cladium jamaicense	Jamaica sawgrass
		Colocasia antiquorum	Elephant ears
		Cyperus iria	Ricefield flatsedge
		Daubentonia punicea	Rattlebox
		Decodon verticillatus	Swamp loosestrife
		Dichromena colorata	Starrush whitetop (white-topped sedge)
		Echinochloa crusgalli	Barnyardgrass
		Eichhornia crassipes	Water hyacinth
		Eupatorium capillifolium	Dogfennel
		Hydrocotyle ranunculoides	Floating pennywort
		Hypericum virginicum	Virginia St. Johnswort
		Hyptis alata	Bushmint
		Iva ciliata	Seacoast sumpweed
		Juncus effusus	*Common rush
		Lemna minor	Common duckweed
		Magnolia virginiana	Sweetbay

*The dominant or most common plants.

TABLE 8.--NATIVE PLANTS ON SELECTED SOILS IN MARSHES--Continued

Soil series	Type of marsh	Scientific name	Common name
Allemands	Freshwater	Myrica cerifera	Waxmyrtle
Kenner		Najas quadalupensis	Southern waternymph
Larose		Nuphar advena	Spatterdock cowlily
		Nymphaea odorata	American waterlily
		Osmunda regalis	Royal fern
		Panicum hemitomon	*Maidencane
		Phyla lanceolata	Lanceleaf fogfruit
		Phyla nodiflora	Turkey tangle fogfruit
		Polygonum hydropiperoides	*Swamp knotweed
		Pontederia cordata	*Pickerelweed
		Sabal minor	Louisiana palmetto
		Sacciolepis striata	American cupscale
		Sagittaria lancifolia	*Bulltongue
		Sagittaria sp.	Arrowhead
		Salix nigra	Black willow
		Saururus cernuus	Lizard tail
		Scirpus californicus	California bulrush
		Scirpus validus	Softstem bulrush
		Sesbania exaltata	Hemp sesbania
		Setaria geniculata	Knotroot bristlegrass
		Setaria magna	Giant bristlegrass
		Typha sp.	*Cattail
		Wolffiella floridana	Florida mudmidget
		Zizaniopsis miliacea	*Southern wildrice

*The dominant or most common plants.

TABLE 9.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor"]

Map symbol and soil name	Potential for habitat elements: Grasses and legumes	Wild herbaceous plants	Hardwood trees	Wetland plants	Shallow water areas	Potential as habitat for wetland wildlife
1 Allemands	Fair	Fair	Fair	Good	Very poor	Good.
2 Allemands	Very poor	Very poor	Very poor	Good	Very poor	Good.
3 Harahan	Fair	Fair	Fair	Good	Good	Good.
4 Barbary	Very poor	Very poor	Very poor	Fair	Poor	Good.
6 Commerce	Good	Good	Good	Fair	Fair	Fair.
7:*						
Commerce	Fair	Fair	Good	Fair	Fair	Fair.
Sharkey	Fair	Fair	Good	Fair	Fair	Fair.
8, 11 Kenner	Very poor	Very poor	Very poor	Good	Very poor	Good.
13, 14 Sharkey	Fair	Fair	Good	Good	Good	Good.
16 Vacherie	Good	Good	Good	Fair	Fair	Fair.
17 Commerce	Good	Good	Good	Fair	Fair	Fair.
18 Larose	Very poor	Very poor	Very poor	Good	Good	Good.
20 Westwego	Fair	Fair	Fair	Good	Good	Good.
22 Scatlake	Very poor	Very poor	Very poor	Good	Good	Good.
23 Felicity	Very poor	Poor	Very poor	Very poor	Poor	Very poor.
24:*						
Timbalier	Very poor	Very poor	Very poor	Good	Good	Good.
Scatlake	Very poor	Very poor	Very poor	Good	Good	Good.
25:*						
Lafitte	Very poor	Very poor	Very poor	Good	Very poor	Good.
Clovelly	Very poor	Very poor	Very poor	Good	Good	Good.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "moderate" and "severe"]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1-----------------Allemands	Severe: excess humus.	Severe: flooding, shrink-swell, low strength.	Severe: flooding, low strength.	Severe: low strength.	Severe: excess humus.
2-----------------Allemands	Severe: excess humus, ponding.	Severe: flooding, shrink-swell, low strength.	Severe: flooding, ponding, low strength.	Severe: flooding, low strength, ponding.	Severe: flooding, ponding, excess humus.
3-----------------Harahan	Severe: excess humus, wetness.	Severe: wetness, shrink-swell, flooding.	Severe: wetness, shrink-swell, flooding.	Severe: low strength, shrink-swell.	Severe: too clayey.
4-----------------Barbary	Severe: excess humus, ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding, excess humus.
6-----------------Commerce	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.
7:*					
Commerce----------	Severe: wetness.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
Sharkey-----------	Severe: wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, shrink-swell.	Severe: low strength, wetness, flooding.	Severe: wetness, flooding, too clayey.
8-----------------Kenner	Severe: excess humus, ponding.	Severe: flooding, low strength, ponding.	Severe: flooding, low strength, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, excess humus.
11----------------Kenner	Severe: excess humus.	Severe: flooding, low strength.	Severe: flooding, low strength.	Severe: low strength.	Severe: excess humus.
13----------------Sharkey	Severe: wetness.	Severe: wetness, shrink-swell, flooding.	Severe: wetness, shrink-swell, flooding.	Severe: low strength, wetness.	Severe: wetness, too clayey.
14----------------Sharkey	Severe: wetness.	Severe: wetness, shrink-swell, flooding.	Severe: wetness, shrink-swell, flooding.	Severe: low strength, wetness.	Severe: wetness.
16----------------Vacherie	Severe: wetness.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: low strength, shrink-swell.	Moderate: wetness.
17----------------Commerce	Severe: wetness.	Moderate: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: low strength.	Moderate: wetness.

See footnote at end of table.

TABLE 10.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
18----------------- Larose	Severe: too clayey, excess humus, ponding.	Severe: flooding, shrink-swell, low strength.	Severe: flooding, shrink-swell, low strength.	Severe: low strength, ponding, shrink-swell.	Severe: flooding, ponding, excess humus.
20----------------- Westwego	Severe: excess humus, wetness.	Severe: flooding, wetness, shrink-swell.	Severe: flooding, wetness, low strength.	Severe: low strength.	Severe: too clayey.
22----------------- Scatlake	Severe: excess humus, ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: excess salt, ponding, flooding.
23----------------- Felicity	Severe: cutbanks cave, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: excess salt, droughty.
24:*					
Timbalier---------	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: low strength, ponding, flooding.	Severe: excess salt, ponding, excess humus.
Scatlake---------	Severe: excess humus, ponding.	Severe: flooding, ponding, shrink-swell.	Severe: flooding, ponding, shrink-swell.	Severe: low strength, ponding, flooding.	Severe: excess salt, ponding, flooding.
25:*					
Lafitte----------	Severe: excess humus, ponding.	Severe: flooding, ponding, low strength.	Severe: flooding, ponding, low strength.	Severe: ponding, flooding, low strength.	Severe: ponding, flooding.
Clovelly---------	Severe: excess humus, ponding.	Severe: flooding, shrink-swell, low strength.	Severe: flooding, ponding, low strength.	Severe: flooding, low strength, ponding.	Severe: flooding, ponding, excess humus.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "severe" and "poor"]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1 Allemands	Severe: percs slowly.	Severe: seepage, excess humus.	Severe: too clayey, excess humus.	Severe: seepage.	Poor: too clayey, excess humus.
2 Allemands	Severe: flooding, ponding, percs slowly.	Severe: ponding, seepage, excess humus.	Severe: ponding, too clayey, excess humus.	Severe: flooding, seepage, ponding.	Poor: too clayey, ponding, excess humus.
3 Harahan	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey, excess humus.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
4 Barbary	Severe: flooding, ponding, percs slowly.	Severe: flooding, excess humus, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
6 Commerce	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: thin layer.
7:*					
Commerce	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: thin layer.
Sharkey	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness, too clayey.	Severe: flooding, wetness.	Poor: too clayey, hard to pack, wetness.
8 Kenner	Severe: flooding, percs slowly.	Severe: flooding, seepage, excess humus.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: ponding, excess humus.
11 Kenner	Severe: percs slowly.	Severe: seepage, excess humus.	Severe: seepage, excess humus.	Severe: seepage.	Poor: excess humus.
13, 14 Sharkey	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
16 Vacherie	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack, wetness.
17 Commerce	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Poor: thin layer.
18 Larose	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding, excess humus.	Severe: flooding, ponding, excess humus.	Severe: flooding, ponding.	Poor: too clayey, ponding, excess humus.

See footnote at end of table.

TABLE 11.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
20------------------ Westwego	Severe: wetness, percs slowly.	Severe: wetness, seepage.	Severe: wetness, too clayey.	Severe: seepage, wetness.	Poor: wetness, too clayey, hard to pack.
22------------------ Scatlake	Severe: flooding, ponding, percs slowly.	Severe: flooding, excess humus, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
23------------------ Felicity	Severe: flooding, poor filter, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, wetness, seepage.	Poor: seepage.
24:*					
Timbalier----------	Severe: flooding, ponding.	Severe: ponding, seepage, excess humus.	Severe: ponding, excess humus, flooding.	Severe: flooding, seepage, ponding.	Poor: ponding, excess humus.
Scatlake-----------	Severe: flooding, ponding, percs slowly.	Severe: flooding, excess humus, ponding.	Severe: flooding, ponding, too clayey.	Severe: flooding, ponding.	Poor: too clayey, hard to pack, ponding.
25:*					
Lafitte------------	Severe: flooding, ponding.	Severe: seepage, flooding, excess humus.	Severe: flooding, ponding, excess humus.	Severe: flooding, seepage, ponding.	Poor: ponding, excess humus.
Clovelly-----------	Severe: flooding, ponding, percs slowly.	Severe: ponding, seepage, excess humus.	Severe: ponding, too clayey, excess humus.	Severe: flooding, seepage, ponding.	Poor: too clayey, ponding, excess humus.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "fair" and "poor"]

Map symbol and soil name	Roadfill	Topsoil
1. Allemands	Poor: low strength, shrink-swell.	Poor: excess humus.
2. Allemands	Poor: low strength, wetness, shrink-swell.	Poor: excess humus, wetness.
3. Harahan	Poor: low strength, shrink-swell.	Poor: too clayey.
4. Barbary	Poor: low strength, wetness, shrink-swell.	Poor: excess humus, wetness.
6. Commerce	Poor: low strength.	Fair: too clayey, thin layer.
7:*		
Commerce	Poor: low strength, wetness.	Fair: thin layer, wetness.
Sharkey	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, wetness.
8. Kenner	Poor: wetness, low strength.	Poor: excess humus, wetness.
11. Kenner	Poor: low strength.	Poor: excess humus.
13. Sharkey	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, wetness.
14. Sharkey	Poor: low strength, wetness, shrink-swell.	Poor: wetness.
16. Vacherie	Poor: low strength, shrink-swell.	Fair: thin layer.
17. Commerce	Poor: low strength.	Fair: thin layer.
18. Larose	Poor: low strength, wetness, shrink-swell.	Poor: too clayey, excess humus, wetness.
20. Westwego	Poor: low strength, shrink-swell.	Poor: too clayey.
22. Scatlake	Poor: low strength, wetness, shrink-swell.	Poor: excess humus, excess salt, wetness.
23. Felicity	Fair: wetness.	Poor: excess salt.
24:*		
Timbalier	Poor: low strength, wetness.	Poor: excess humus, excess salt, wetness.
Scatlake	Poor: low strength, wetness, shrink-swell.	Poor: excess humus, excess salt, wetness.
25:*		
Lafitte	Poor: wetness, low strength.	Poor: excess humus, wetness.
Clovelly	Poor: low strength, wetness, shrink-swell.	Poor: excess humus, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe"]

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Grassed waterways
1 Allemands	Slight	Severe: piping, excess humus.	Slight	Percs slowly, subsides.	Wetness, percs slowly.
2 Allemands	Slight	Severe: piping, ponding, excess humus.	Slight	Flooding, percs slowly, subsides.	Wetness, percs slowly.
3 Harahan	Slight	Severe: excess humus, hard to pack, wetness.	Severe: slow refill.	Percs slowly, subsides.	Wetness, percs slowly.
4 Barbary	Slight	Severe: excess humus, hard to pack, ponding.	Severe: slow refill.	Ponding, percs slowly, subsides.	Wetness, percs slowly.
6 Commerce	Moderate: seepage.	Severe: thin layer, wetness.	Severe: slow refill.	Favorable	Erodes easily.
7:*					
Commerce	Moderate: seepage.	Severe: thin layer, wetness.	Severe: slow refill.	Flooding	Erodes easily.
Sharkey	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly, flooding.	Wetness, percs slowly.
8 Kenner	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Flooding, percs slowly, subsides.	Wetness, percs slowly.
11 Kenner	Severe: seepage.	Severe: excess humus.	Severe: slow refill.	Percs slowly, subsides.	Wetness.
13 Sharkey	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly	Wetness, percs slowly.
14 Sharkey	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly	Wetness, erodes easily, percs slowly.
16 Vacherie	Slight	Severe: hard to pack, wetness.	Severe: slow refill.	Percs slowly	Wetness, erodes easily, percs slowly.
17 Commerce	Moderate: seepage.	Severe: thin layer, wetness.	Severe: slow refill.	Favorable	Erodes easily.
18 Larose	Slight	Severe: excess humus, hard to pack, ponding.	Severe: slow refill.	Percs slowly, flooding, subsides.	Wetness, percs slowly.

See footnote at end of table.

TABLE 13.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Grassed waterways
20 Westwego	Slight	Severe: hard to pack, wetness.	Slight	Subsides, percs slowly.	Wetness, percs slowly.
22 Scatlake	Slight	Severe: excess humus, hard to pack, ponding.	Severe: slow refill.	Flooding, percs slowly, subsides.	Wetness, excess salt, percs slowly.
23 Felicity	Severe: seepage.	Severe: seepage.	Severe: cutbanks cave.	Flooding, cutbanks cave, excess salt.	Excess salt, droughty.
24:*					
Timbalier	Severe: seepage.	Severe: excess humus, ponding.	Moderate: salty water.	Flooding, subsides, excess salt.	Wetness, excess salt.
Scatlake	Slight	Severe: excess humus, hard to pack, ponding.	Severe: slow refill.	Flooding, percs slowly, subsides.	Wetness, excess salt.
25:*					
Lafitte	Severe: seepage.	Severe: excess humus, ponding.	Severe: slow refill.	Ponding, flooding, subsides.	Wetness, excess salt.
Clovelly	Slight	Severe: piping, ponding, excess humus.	Slight	Flooding, percs slowly, subsides.	Wetness, percs slowly, excess salt.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated]

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
1----------------- Allemands	0-41	Muck-------------	Pt	A-8	0	---	---	---	---	---	---
	41-60	Clay, mucky clay	MH, OH	A-7-5	0	100	100	95-100	80-100	65-90	30-50
2----------------- Allemands	0-23	Muck-------------	Pt	A-8	0	---	---	---	---	---	---
	23-55	Clay, mucky clay	MH, OH	A-7-5	0	100	100	95-100	80-100	65-90	30-50
	55-60	Muck-------------	Pt	A-8	0	---	---	---	---	---	---
3----------------- Harahan	0-4	Clay-------------	OH, MH, CH	A-7-5, A-8, A-7-6	0	100	100	100	95-100	60-90	35-50
	4-20	Clay, silty clay	CH, MH	A-7-6, A-7-6	0	100	100	100	95-100	60-90	35-50
	20-75	Clay, silty clay, mucky clay.	OH, MH, CH	A-7-5, A-8, A-7-6	0	100	100	100	95-100	60-90	35-50
4----------------- Barbary	0-6	Muck-------------	Pt	A-8	0	---	---	---	---	---	---
	6-66	Mucky clay, clay	OH, MH	A-7-5, A-8	0	100	100	100	95-100	70-90	35-45
6----------------- Commerce	0-5	Silty clay loam	CL	A-6, A-7-6	0	100	100	100	90-100	32-50	11-25
	5-72	Silty clay loam, silt loam, loam.	CL	A-6, A-7-6	0	100	100	100	85-100	32-45	11-23
7:*											
Commerce---------	0-8	Silt loam--------	CL-ML, CL, ML	A-4	0	100	100	100	75-100	<30	NP-10
	8-60	Silty clay loam, silt loam, loam.	CL	A-6, A-7-6	0	100	100	100	85-100	32-45	11-23
Sharkey----------	0-9	Clay-------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	9-60	Clay-------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
8----------------- Kenner	0-12	Muck-------------	Pt	A-8	0	---	---	---	---	---	---
	12-19	Clay, silty clay, mucky clay.	MH, OH	A-7-5	0	100	100	100	95-100	70-100	30-55
	19-38	Muck-------------	Pt	A-8	0	---	---	---	---	---	---
	38-42	Clay, silty clay, mucky clay.	MH, OH	A-7-5	0	100	100	100	95-100	70-100	30-55
	42-99	Muck-------------	Pt	A-8	0	---	---	---	---	---	---
11---------------- Kenner	0-96	Muck-------------	Pt	A-8	0	---	---	---	---	---	---
13---------------- Sharkey	0-4	Clay-------------	CH, CL	A-7-6, A-7-5	0	100	100	100	95-100	46-85	22-50
	4-43	Clay-------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
	43-60	Clay, silty clay, silty clay loam.	CL, CH	A-6, A-7-6, A-7-5	0	100	100	100	95-100	32-85	11-50
14---------------- Sharkey	0-5	Silty clay loam	CL	A-6, A-7-6	0	100	100	100	95-100	32-50	11-25
	5-60	Clay-------------	CH	A-7-6, A-7-5	0	100	100	100	95-100	56-85	30-50
16---------------- Vacherie	0-28	Silt loam--------	ML, CL-ML	A-4	0	100	100	95-100	65-100	<27	NP-7
	28-60	Clay, silty clay	CH	A-7-6	0	100	100	100	95-100	51-75	26-45

See footnote at end of table.

TABLE 14.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
17---------------- Commerce	0-4	Silt loam---------	CL-ML, CL, ML	A-4	0	100	100	100	75-100	<30	NP-10
	4-45	Silty clay loam, silt loam, loam.	CL	A-6, A-7-6	0	100	100	100	85-100	32-45	11-23
	45-60	Stratified very fine sandy loam to silty clay.	CL-ML, CL, ML	A-4, A-6, A-7-6	0	100	100	100	75-100	23-45	3-23
18---------------- Larose	0-4	Muck--------------	Pt	A-8	0	---	---	---	---	---	---
	4-76	Clay, silty clay, mucky clay.	OH, MH, CH	A-7-5, A-7-6	0	100	100	100	90-100	60-87	30-52
20---------------- Westwego	0-21	Clay--------------	OH, MH, CH	A-7-5, A-8, A-7-6	0	100	100	100	95-100	50-90	35-75
	21-36	Muck, peat--------	Pt	A-8	0	---	---	---	---	---	---
	36-80	Clay, mucky clay	OH, MH, CH	A-7-5, A-8, A-7-6	0	100	100	100	95-100	50-90	35-75
22---------------- Scatlake	0-6	Muck--------------	Pt	A-8	0	---	---	---	---	---	---
	6-14	Mucky clay, clay, mucky silty clay loam.	OH, MH	A-7-5	0	100	100	100	95-100	55-90	15-45
	14-66	Clay--------------	MH, OH	A-7-5	0	100	100	100	95-100	70-90	35-45
23---------------- Felicity	0-60	Loamy fine sand	SP-SM, SM	A-2, A-3	0-10	85-100	75-100	51-80	5-30	<20	NP-4
24:*											
Timbalier--------	0-66	Muck--------------	Pt	A-8	0	---	---	---	---	---	---
	66-72	Mucky clay, clay, silty clay.	OH, CH, CL	A-7-6, A-7-5	0	100	100	100	90-100	47-87	25-52
Scatlake---------	0-5	Muck--------------	Pt	A-8	0	---	---	---	---	---	---
	5-60	Clay--------------	MH, OH	A-7-5	0	100	100	100	95-100	70-90	35-45
25:*											
Lafitte----------	0-56	Muck--------------	Pt	A-8	0	---	---	---	---	---	---
	56-84	Clay, silty clay, silty clay loam.	MH, CH, ML, CL	A-7-5, A-7-6	0	100	100	90-100	80-100	45-100	16-60
Clovelly---------	0-40	Muck--------------	Pt	A-8	0	---	---	---	---	---	---
	40-84	Clay, silty clay, mucky clay.	CH, CL, MH	A-7-6, A-7-5	0	100	100	95-100	85-95	47-87	25-50

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH	Mmhos/cm				Pct
1----------------- Allemands	0-41	---	0.05-0.25	>6.0	0.20-0.50	3.6-6.5	<4	Low----------	----	---	30-70
	41-60	60-95	0.25-1.00	<0.06	0.14-0.18	6.1-8.4	<4	Very high	0.32		
2----------------- Allemands	0-23	---	0.05-0.25	>2.0	0.20-0.50	5.1-7.8	<4	Low----------	----	---	30-70
	23-55	60-95	0.25-1.00	<0.06	0.14-0.18	6.1-8.4	<4	Very high	0.32		
	55-60	---	0.05-0.25	>2.0	0.20-0.50	6.1-8.4	<4	Low----------	----		
3----------------- Harahan	0-4	50-95	0.50-1.50	<0.06	0.11-0.30	5.1-7.3	<2	Very high	0.37	5	2-25
	4-20	60-95	1.20-1.50	<0.06	0.11-0.20	5.1-7.3	<2	Very high	0.37		
	20-75	60-95	0.25-1.00	<0.06	0.11-0.30	5.1-8.4	<2	Very high	0.37		
4----------------- Barbary	0-6	45-90	0.05-0.25	2.0-6.0	0.20-0.50	6.1-7.8	<2	Low----------	----	---	30-70
	6-66	60-95	0.15-1.00	<0.06	0.18-0.20	6.6-8.4	<2	Very high	0.37		
6----------------- Commerce	0-5	27-39	1.45-1.70	0.2-0.6	0.20-0.22	5.6-8.4	<2	Moderate-----	0.37	5	.5-2
	5-72	14-39	1.35-1.70	0.2-0.6	0.20-0.22	6.1-8.4	<2	Moderate-----	0.32		
7:*											
Commerce---------	0-8	14-27	1.35-1.65	0.6-2.0	0.21-0.23	5.6-8.4	<2	Low----------	0.43	5	.5-2
	8-60	14-39	1.35-1.70	0.2-0.6	0.20-0.22	6.1-8.4	<2	Moderate-----	0.32		
Sharkey----------	0-9	40-60	1.20-1.50	<0.06	0.18-0.20	5.1-8.4	<2	Very high	0.32	5	.5-2
	9-60	60-90	1.20-1.50	<0.06	0.18-0.20	5.6-8.4	<2	Very high	0.28		
8----------------- Kenner	0-12	---	0.05-0.25	>6.0	0.20-0.50	6.1-7.3	<2	Low----------	----	---	30-60
	12-19	45-85	0.15-1.00	<0.06	0.12-0.18	6.6-8.4	<2	High---------	0.32		
	19-38	---	0.05-0.25	>6.0	0.20-0.50	6.6-8.4	<2	Low----------	----		
	38-42	45-85	0.15-1.00	<0.06	0.12-0.18	6.6-8.4	<2	High---------	0.32		
	42-99	---	0.05-0.25	>6.0	0.20-0.50	6.6-8.4	<2	Low----------	----		
11---------------- Kenner	0-96	---	0.05-1.00	>6.0	0.20-0.50	3.6-8.4	<2	Low----------	----	---	30-60
13---------------- Sharkey	0-4	40-60	1.20-1.50	<0.06	0.18-0.20	5.1-8.4	<2	Very high	0.32	5	.5-2
	4-43	60-90	1.20-1.50	<0.06	0.18-0.20	5.6-8.4	<2	Very high	0.28		
	43-60	25-90	1.20-1.75	0.06-0.2	0.18-0.22	6.6-8.4	<2	High---------	0.28		
14---------------- Sharkey	0-5	27-35	1.40-1.75	0.2-0.6	0.20-0.22	5.1-8.4	<2	Moderate-----	0.37	5	.5-2
	5-60	60-90	1.20-1.50	<0.06	0.18-0.20	5.6-8.4	<2	Very high	0.28		
16---------------- Vacherie	0-28	10-18	1.35-1.70	0.6-2.0	0.20-0.23	5.6-8.4	<2	Low----------	0.49	5	.5-2
	28-60	40-65	1.10-1.45	<0.06	0.18-0.20	6.6-8.4	<2	Very high	0.32		
17---------------- Commerce	0-4	14-27	1.35-1.65	0.6-2.0	0.21-0.23	5.6-8.4	<2	Low----------	0.37	5	.5-2
	4-45	14-39	1.35-1.70	0.2-0.6	0.20-0.22	6.1-8.4	<2	Moderate-----	0.32		
	45-60	14-60	1.35-1.75	0.2-2.0	0.20-0.23	6.6-8.4	<2	Low----------	0.37		
18---------------- Larose	0-4	---	0.05-0.25	>2.0	0.20-0.50	5.6-7.8	<4	Low----------	----	---	30-70
	4-76	50-80	0.15-1.00	<0.06	0.14-0.18	6.1-8.4	<4	Very high	0.28		
20---------------- Westwego	0-21	50-95	0.50-1.50	<0.06	0.11-0.30	4.5-6.5	<2	High---------	0.37	5	2-25
	21-36	---	0.15-0.50	2.0-6.0	0.20-0.50	4.5-6.5	<2	High---------	----		
	36-80	60-95	0.25-1.00	<0.06	0.11-0.30	6.6-8.4	<2	Very high	0.37		
22---------------- Scatlake	0-6	---	0.05-0.25	>2.0	0.15-0.40	6.6-8.4	8-16	-------------	----	---	30-70
	6-14	27-60	0.25-1.00	<0.2	0.05-0.15	6.6-8.4	8-16	Very high	0.24		
	14-66	60-85	0.25-1.00	<0.06	0.05-0.15	6.6-8.4	8-16	Very high	0.28		
23---------------- Felicity	0-60	3-10	1.50-1.70	>20	0.03-0.06	6.6-8.4	8-16	Low----------	0.15	5	<.5
24:*											
Timbalier--------	0-66	---	0.05-0.25	>2.0	0.15-0.40	6.6-8.4	8-16	Low----------	----	---	30-70
	66-72	50-80	0.15-1.00	<0.06	0.10-0.17	7.9-8.4	4-16	Very high	0.28		

See footnote at end of table.

TABLE 15.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Soil reaction	Salinity	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	G/cm3	In/hr	In/in	pH	Mmhos/cm				Pct
24:*											
Scatlake--------	0-5	---	0.05-0.25	>2.0	0.15-0.40	6.6-8.4	8-16	------------	----	---	30-70
	5-60	60-85	0.25-1.00	<0.06	0.05-0.15	6.6-8.4	8-16	Very high	0.28		
25:*											
Lafitte---------	0-56	---	0.05-0.25	2.0-6.0	0.18-0.45	6.6-8.4	4-8	Low----------	----	---	30-70
	56-84	30-85	0.25-1.00	<0.06	0.11-0.18	7.4-8.4	4-8	High---------	0.32		
Clovelly--------	0-40	---	0.05-0.25	>2.0	0.18-0.45	6.6-8.4	4-8	Low----------	----	---	30-60
	40-84	50-90	0.15-1.00	<0.06	0.11-0.18	7.4-8.4	4-8	Very high	0.28		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," and "apparent" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Map symbol and soil name	Hydro- logic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Ini- tial	Total	Uncoated steel	Concrete
					Ft			In	In		
1----------------- Allemands	D	Rare---------	---	---	2-4.0	Apparent	Jan-Dec	8-25	16-51	High-----	High.
2*---------------- Allemands	D	Frequent----	Very long	Jan-Dec	+1-0.5	Apparent	Jan-Dec	8-25	16-51	High-----	Moderate.
3----------------- Harahan	D	Rare---------	---	---	1.0-3.0	Apparent	Jan-Dec	2-5	4-10	High-----	Moderate.
4*---------------- Barbary	D	Frequent----	Very long	Jan-Dec	+1-0.5	Apparent	Jan-Dec	3-12	6-15	High-----	Moderate.
6----------------- Commerce	C	None---------	---	---	1.5-4.0	Apparent	Dec-Apr	---	---	High-----	Low.
7:											
Commerce----------	C	Frequent----	Brief to long.	Dec-Jun	0-2.0	Apparent	Dec-Apr	---	---	High-----	Low.
Sharkey-----------	D	Frequent----	Brief to long.	Dec-Jun	0-2.0	Apparent	Dec-Apr	---	---	High-----	Low.
8*---------------- Kenner	D	Frequent----	Very long	Jan-Dec	+1-0.5	Apparent	Jan-Dec	15-30	>51	High-----	Moderate.
11---------------- Kenner	D	Rare---------	---	---	2-4.0	Apparent	Jan-Dec	15-30	>51	High-----	High.
13, 14------------ Sharkey	D	Rare---------	---	---	0-2.0	Apparent	Dec-Apr	---	---	High-----	Low.
16---------------- Vacherie	C	None---------	---	---	1.0-3.0	Apparent	Dec-Apr	---	---	High-----	Low.
17---------------- Commerce	C	None---------	---	---	1.5-4.0	Apparent	Dec-Apr	---	---	High-----	Low.
18*--------------- Larose	D	Frequent----	Very long	Jan-Dec	+3-0.5	Apparent	Jan-Dec	2-4	5-15	High-----	Moderate.
20---------------- Westwego	D	Rare---------	---	---	1.0-3.0	Apparent	Jan-Dec	3-8	6-20	High-----	Moderate.
22*--------------- Scatlake	D	Frequent----	Very long	Jan-Dec	+1-0.5	Apparent	Jan-Dec	3-12	6-15	High-----	Moderate.
23---------------- Felicity	A	Occasional	Brief-----	Jan-Dec	2.0-3.0	Apparent	Jan-Dec	---	---	High-----	Moderate.
24:*											
Timbalier---------	D	Frequent----	Very long	Jan-Dec	+1-0.5	Apparent	Jan-Dec	15-30	>51	High-----	Low.
Scatlake----------	D	Frequent----	Very long	Jan-Dec	+1-0.5	Apparent	Jan-Dec	3-12	6-15	High-----	Moderate.
25:*											
Lafitte-----------	D	Frequent----	Very long	Jan-Dec	+1-0.5	Apparent	Jan-Dec	15-30	>51	High-----	Moderate.
Clovelly----------	D	Frequent----	Very long	Jan-Dec	+1-0.5	Apparent	Jan-Dec	8-25	16-51	High-----	Moderate.

* In the "High water table--Depth" column, a plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral indicates how high the water rises above the surface, and the second indicates the depth below the surface.

TABLE 17.--CLASSIFICATION OF THE SOILS

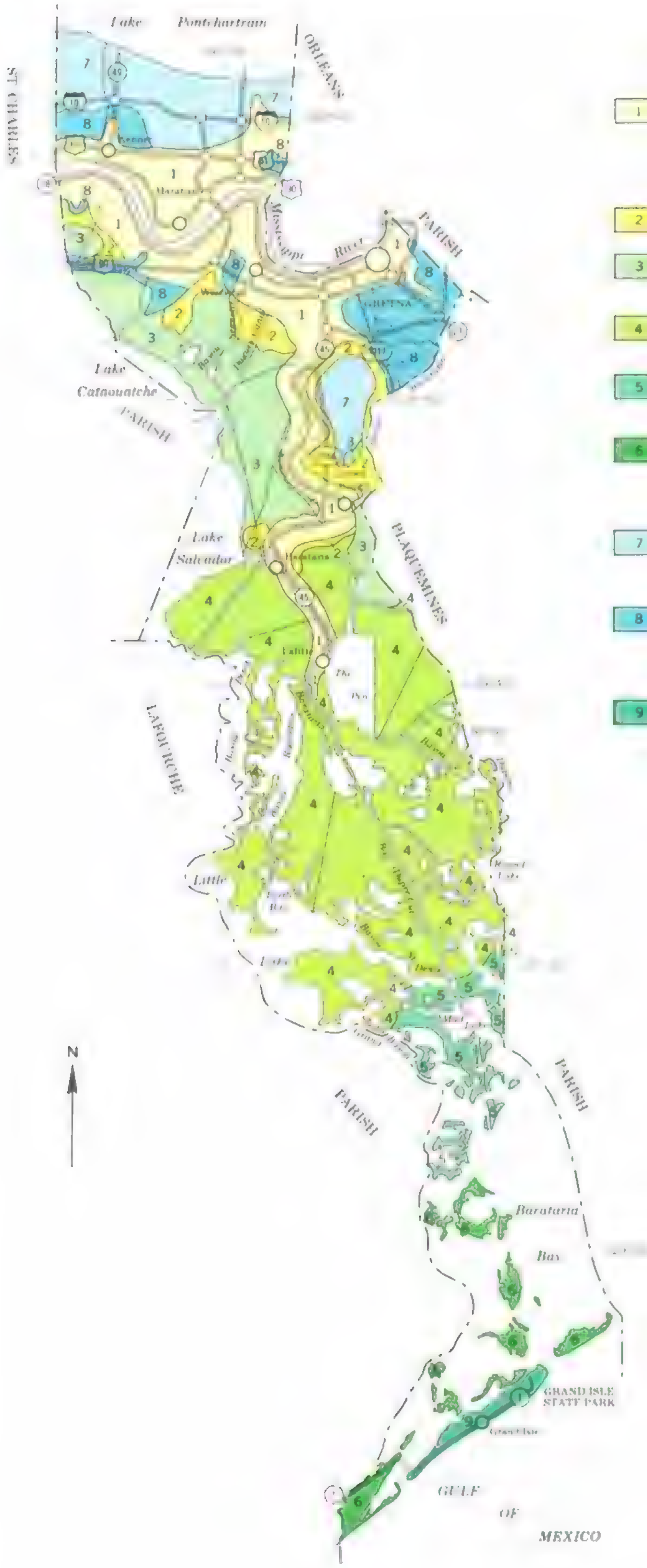
Soil name	Family or higher taxonomic class
Allemands	Clayey, montmorillonitic, euic, thermic Terric Medisaprists
Barbary	Very-fine, montmorillonitic, nonacid, thermic Typic Hydraquents
Clovelly	Clayey, montmorillonitic, euic, thermic Terric Medisaprists
Commerce	Fine-silty, mixed, nonacid, thermic Aeric Fluvaquents
Felicity	Mixed, thermic Aquic Udipsamments
Harahan	Very-fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Kenner	Euic, thermic Fluvaquentic Medisaprists
Lafitte	Euic, thermic Typic Medisaprists
Larose	Very-fine, montmorillonitic, nonacid, thermic Typic Hydraquents
Scatlake	Very-fine, montmorillonitic, nonacid, thermic Typic Hydraquents
Sharkey	Very-fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Timbalier	Euic, thermic Typic Medisaprists
Vacherie	Coarse-silty over clayey, mixed, nonacid, thermic Aeric Fluvaquents
Westwego	Very-fine, montmorillonitic, nonacid, thermic, cracked Thapto-Histic Fluvaquents

☆ U.S. GOVERNMENT PRINTING OFFICE : 1982 O - 372-171

Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.



LEGEND

SOILS ON THE NATURAL LEVEES THAT ARE PROTECTED FROM FLOODING

1 — Sharkey-Commerce: Level, poorly drained and somewhat poorly drained soils that have a clayey or loamy surface layer and clayey subsoil or that are loamy throughout

SOILS IN MARSHES AND SWAMPS THAT ARE FREQUENTLY FLOODED AND PONDED

2 — Barbary: Level, very poorly drained soils that have a thin mucky surface layer and clayey underlying material; in swamps

3 — Kenner-Allemands: Level, very poorly drained soils that have a moderately thick mucky surface layer and mucky and clayey underlying material; in freshwater marshes

4 — Lafitte-Clovelly: Level, very poorly drained soils that have a thick or moderately thick mucky surface layer and clayey underlying material; in brackish marshes

5 — Timbalier-Scatlake: Level, very poorly drained soils that have a thick or thin mucky surface layer and clayey underlying material, in saline marshes

6 — Scatlake: Level, very poorly drained soils that have a thin mucky surface layer and clayey underlying material, in saline marshes

SOILS IN FORMER MARSHES AND SWAMPS THAT ARE DRAINED AND PROTECTED FROM FLOODING

7 — Kenner, drained-Allemands, drained: Level, poorly drained soils that have a thick or moderately thick mucky surface layer and mucky and clayey underlying material; in former freshwater marshes

8 — Westwego-Harahan: Level, poorly drained soils that have a clayey surface layer and subsoil; in former swamps

SOILS ON SANDY RIDGES THAT ARE OCCASIONALLY FLOODED

9 — Felicity: Gently undulating, somewhat poorly drained soils that are sandy throughout

Compiled 198

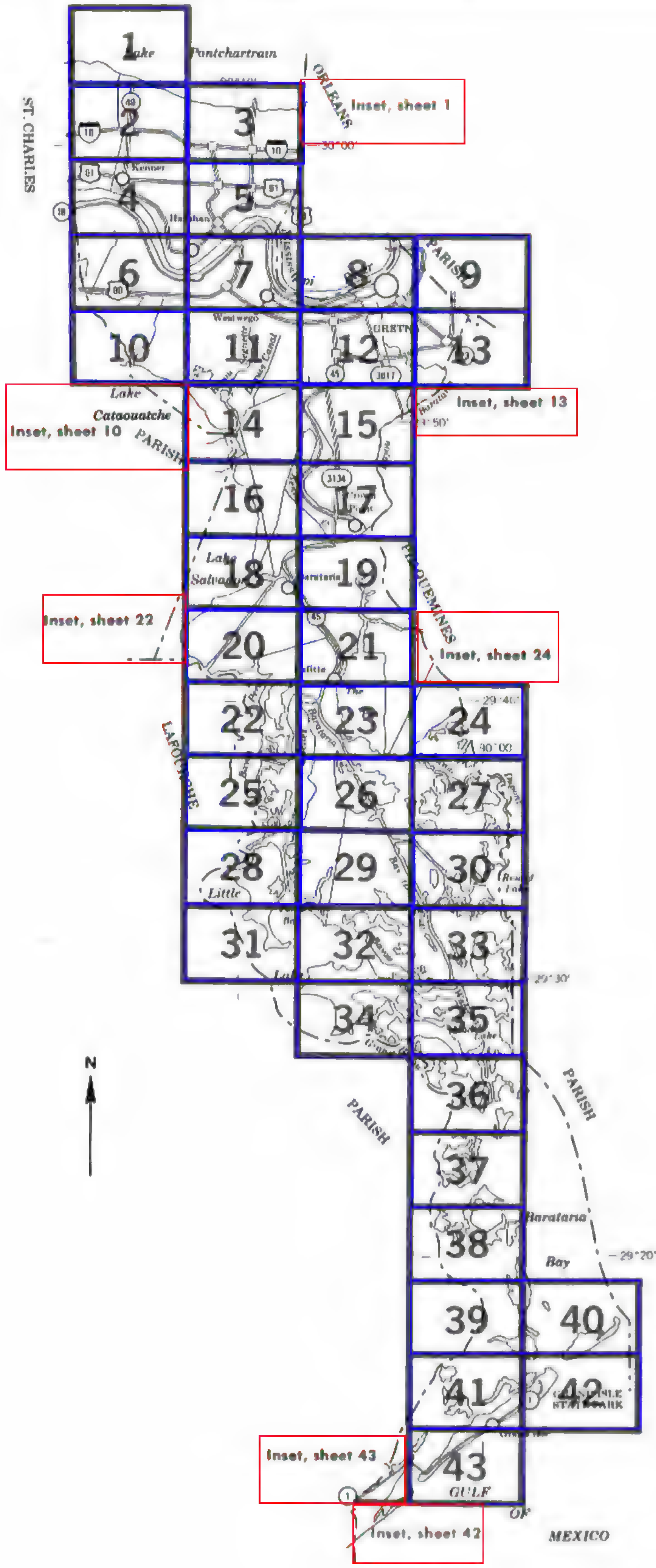
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
LOUISIANA AGRICULTURAL EXPERIMENT STATION
LOUISIANA STATE SOIL AND WATER CONSERVATION COMMITTEE

GENERAL SOIL MAP
JEFFERSON PARISH, LOUISIANA

Scale 1:316,800

1 0 1 2 3 4 5 Miles

1 0 5 10 Km



INDEX TO MAP SHEETS
JEFFERSON PARISH, LOUISIANA

Scale 1:316,800

1 0 1 2 3 4 5 Miles

1 0 5 10 Km

SOIL LEGEND

Map Symbols are numeric. Units in the correlation are listed in two legends, the first is alphabetical and the second is numerical. The field map symbols and the publication symbols are the same. The soil names followed by the superscript 1/ are broadly defined.

SYMBOL	NAME
1	Allemands muck, drained
2	Allemands muck 1/
3	Harahan clay
4	Barbary muck 1/
6	Commerce silty clay loam
7	Commerce and Sharkey soils, frequently flooded
8	Kenner muck 1/
11	Kenner muck, drained
13	Sharkey clay
14	Sharkey silty clay loam
16	Vacherie silt loam, gently undulating
17	Commerce silt loam
18	Larose muck 1/
20	Westwego clay
22	Scatlake muck 1/
23	Felicity loamy fine sand, occasionally flooded
24	Timbalier-Scatlake association 1/
25	Lafitte-Clovelly association 1/

1/ The composition of these units is more variable than that of others in the survey area but has been controlled well enough to be interpreted for the expected use of the soils.

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline & neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool

STATE COORDINATE TICK

LAND DIVISION CORNERS (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate
- Federal
- State
- County, farm or ranch

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or small

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label)
- Located object (label)
- Tank (label)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end
- Canals or ditches
  - Double line (label)
  - Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial
- Intermittent

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

GULLY

DEPRESSION OR SINK

SOIL SAMPLE SITE (normally not shown)

MISCELLANEOUS

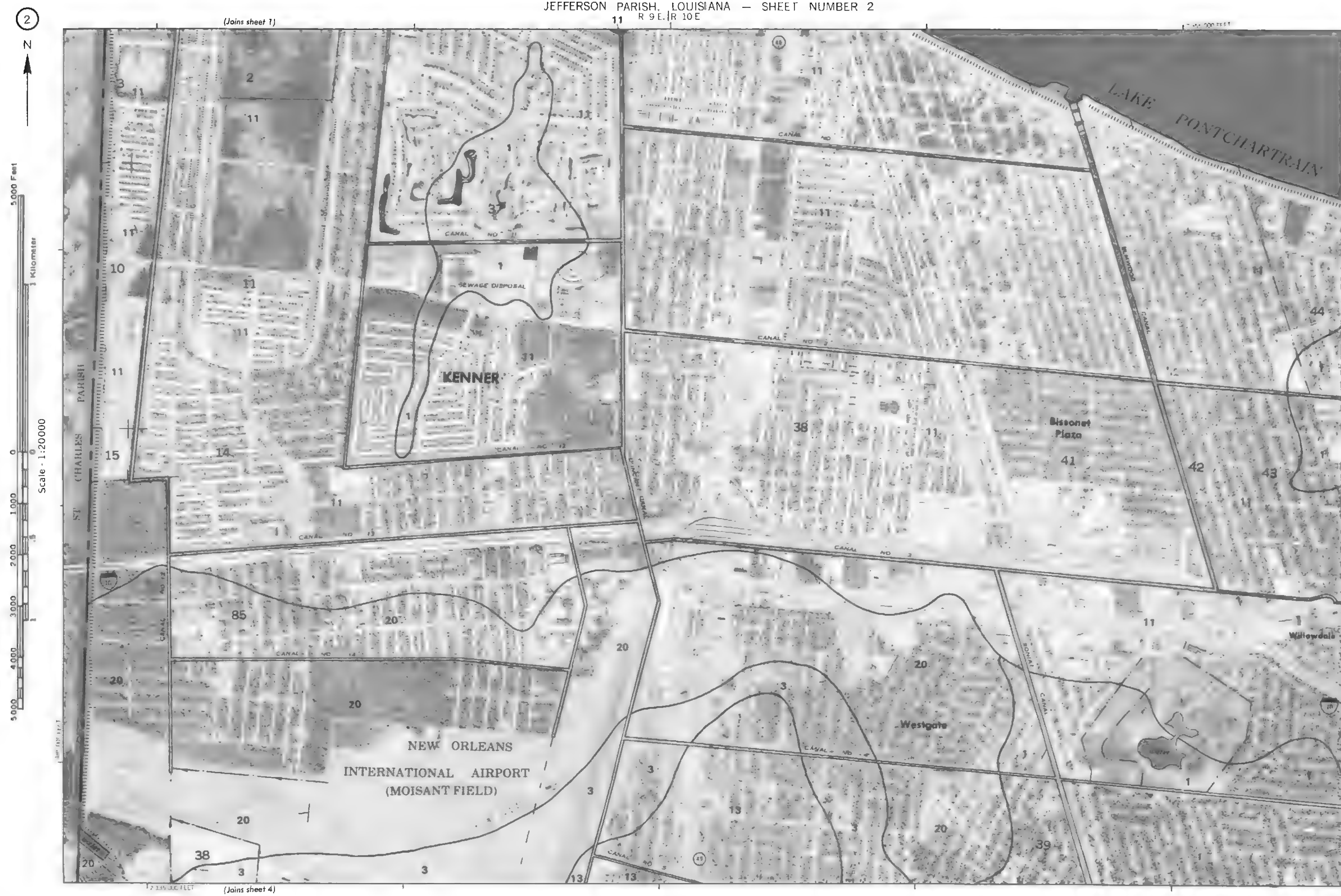
- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot

JEFFERSON PARISH, LOUISIANA — SHEET NUMBER 1

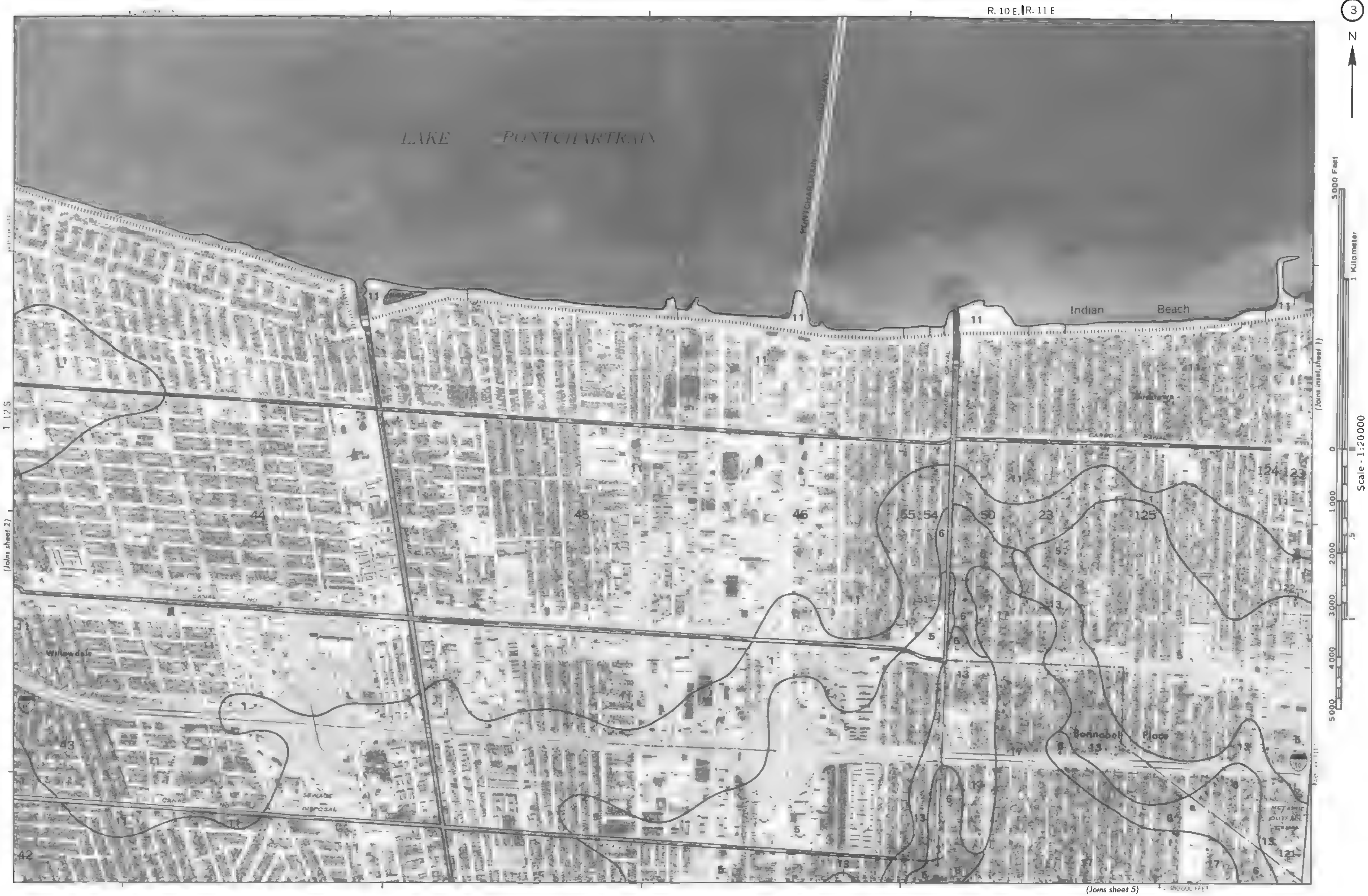
JEFFERSON PARISH, LOUISIANA NO. 1

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA — SHEET NUMBER 2

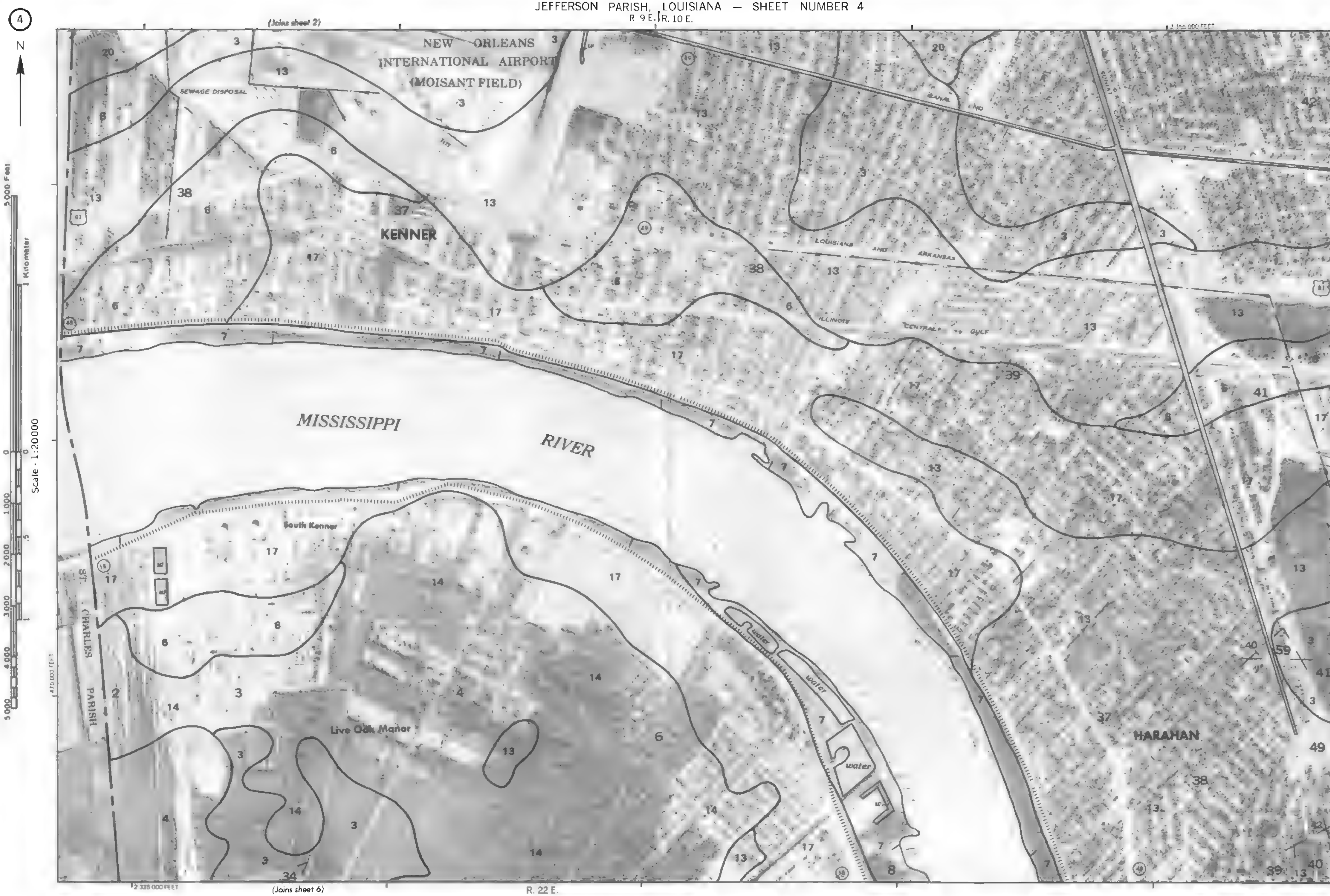


This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



JEFFERSON PARISH, LOUISIANA NO. 3

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA NO. 5

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA NO. 7
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

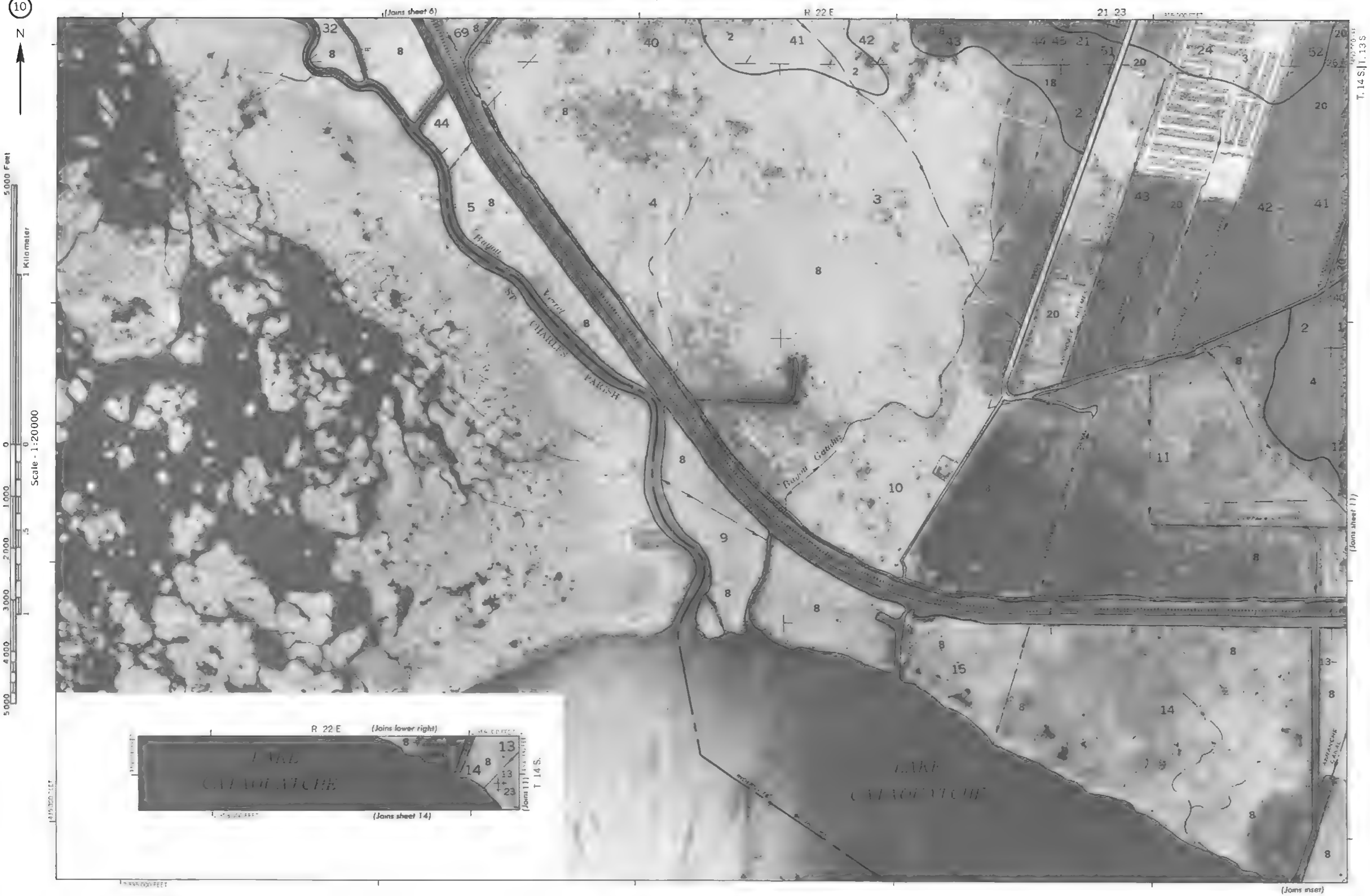
N

Scale 1:20000
5000 Feet
1 Kilometer

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA NO. 9
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA — SHEET NUMBER 10



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks, and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA NO. 11
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1973 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA — SHEET NUMBER 12

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA — SHEET NUMBER 13

JEFFERSON PARISH, LOUISIANA NO. 13

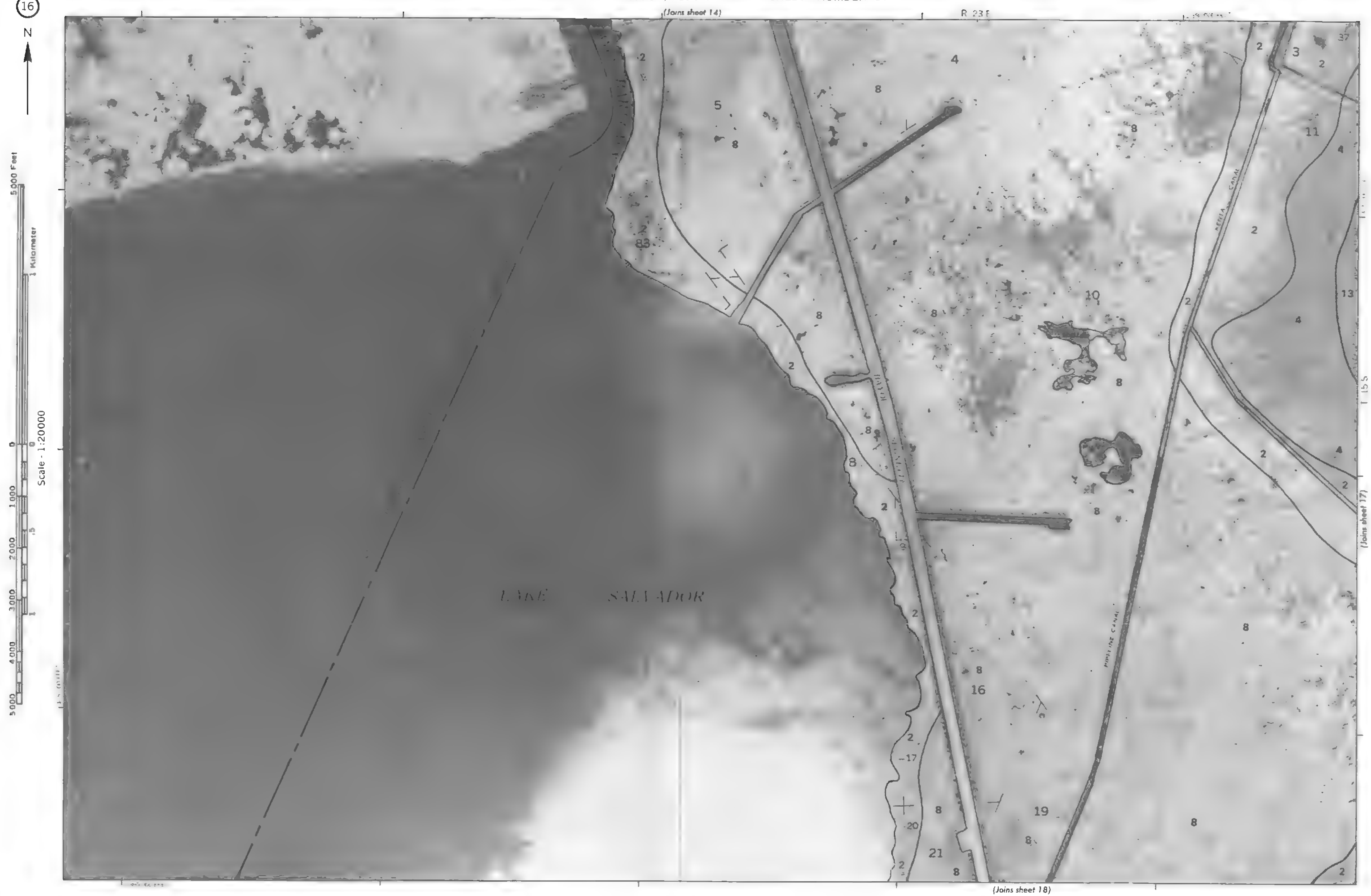
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA NO. 14

JEFFERSON PARISH, LOUISIANA NO. 15
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

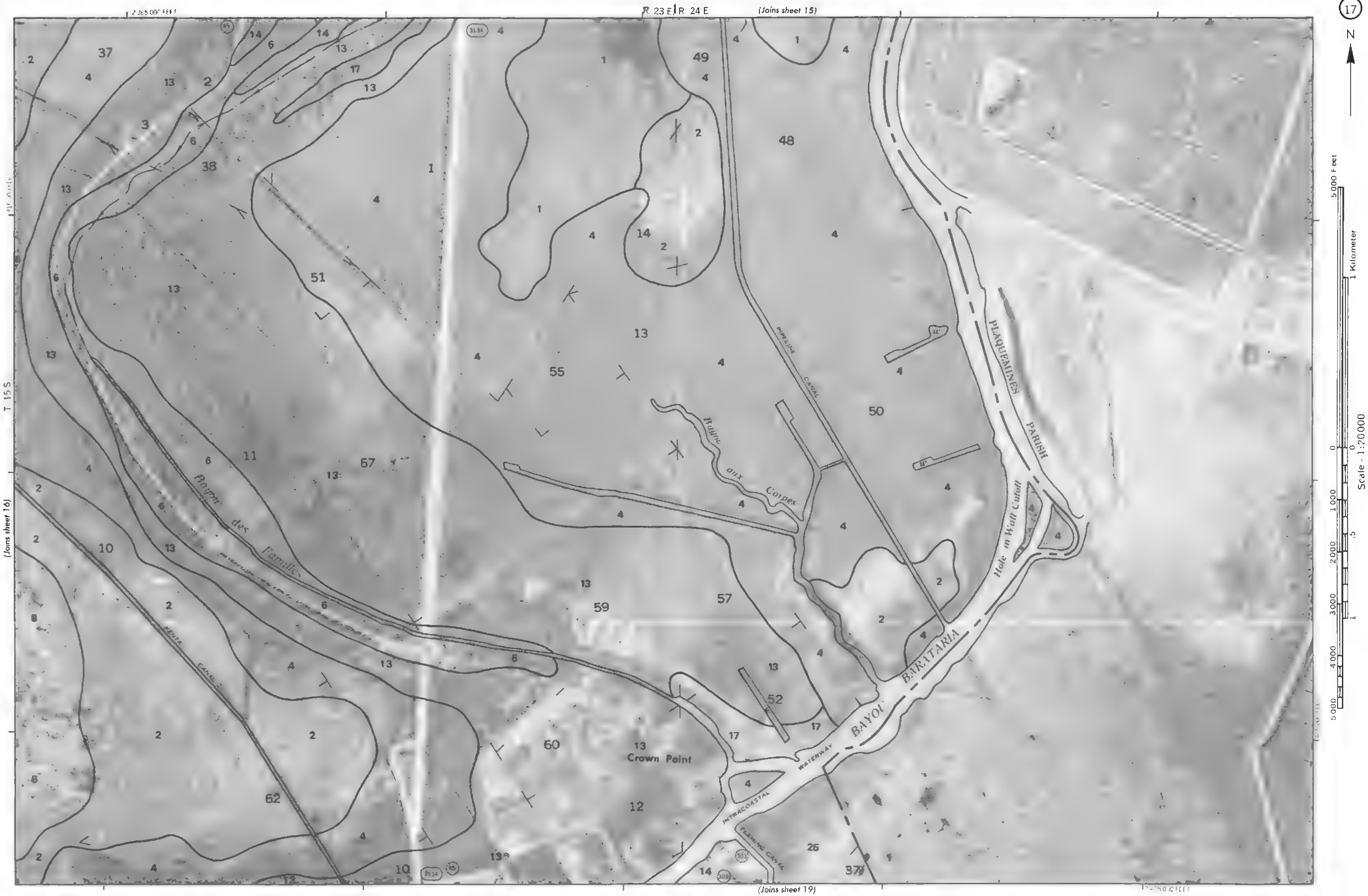
JEFFERSON PARISH, LOUISIANA — SHEET NUMBER 16



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

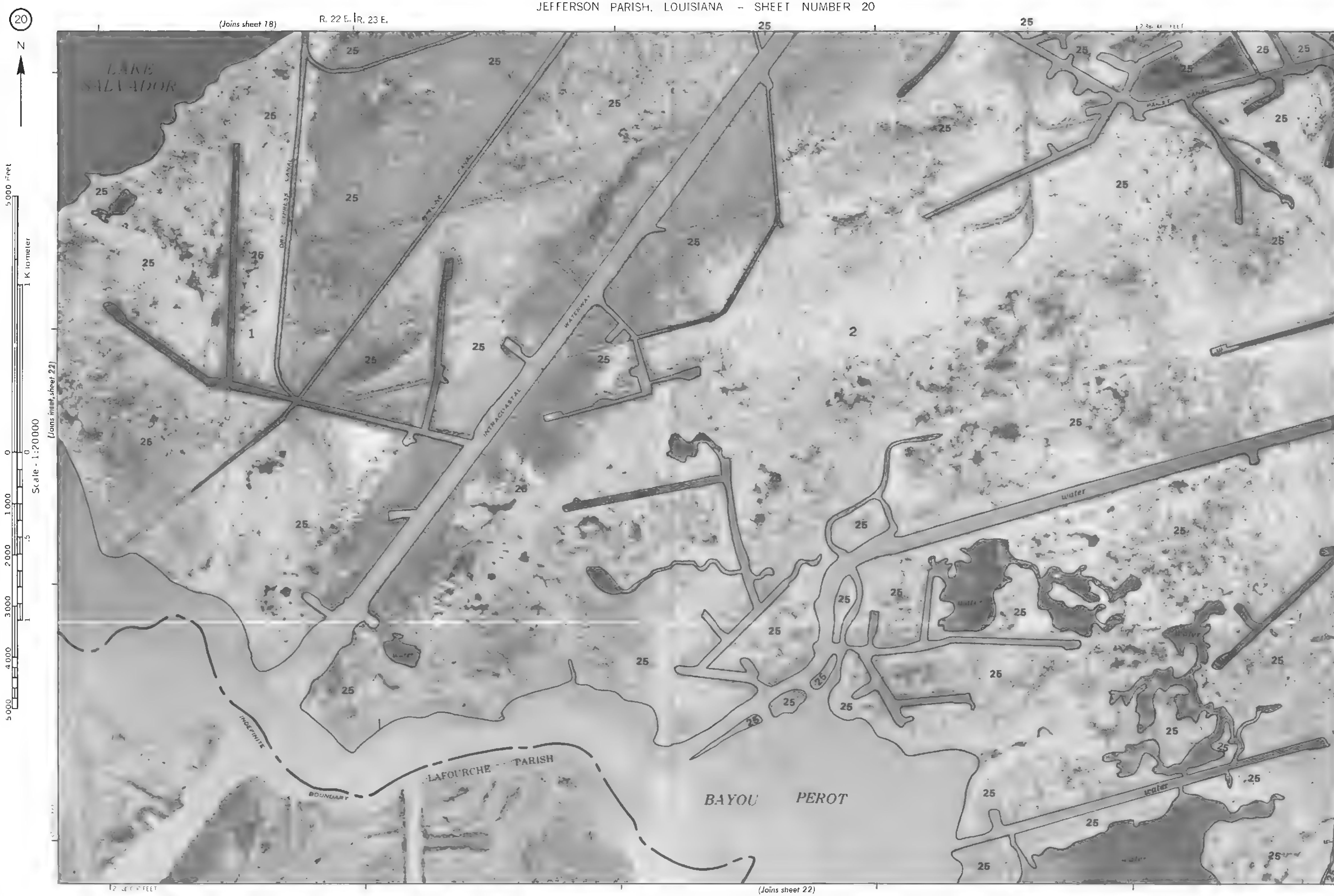
JEFFERSON PARISH, LOUISIANA NO. 16

JEFFERSON PARISH, LOUISIANA NO. 17
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



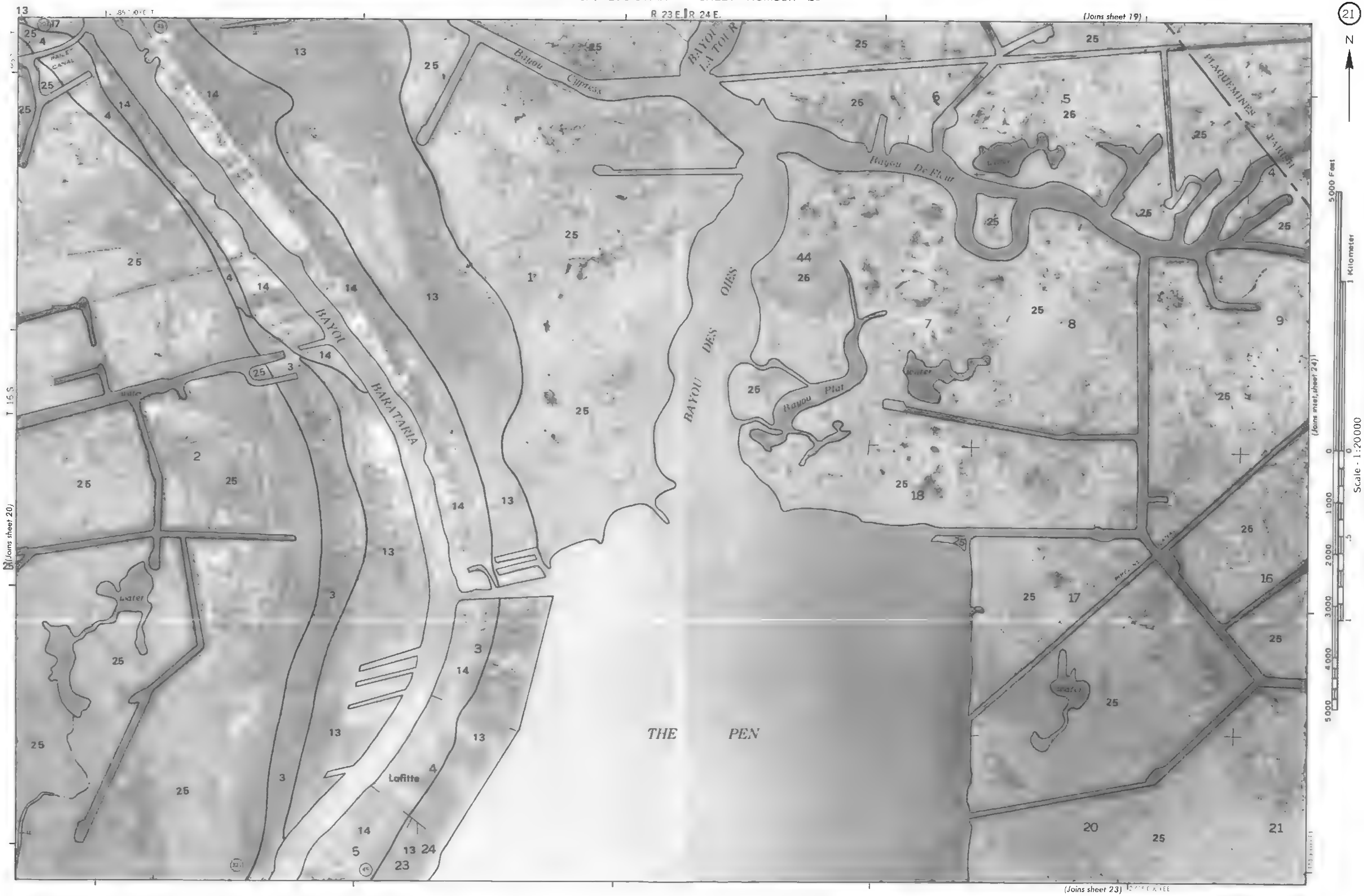
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA NO. 19
This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



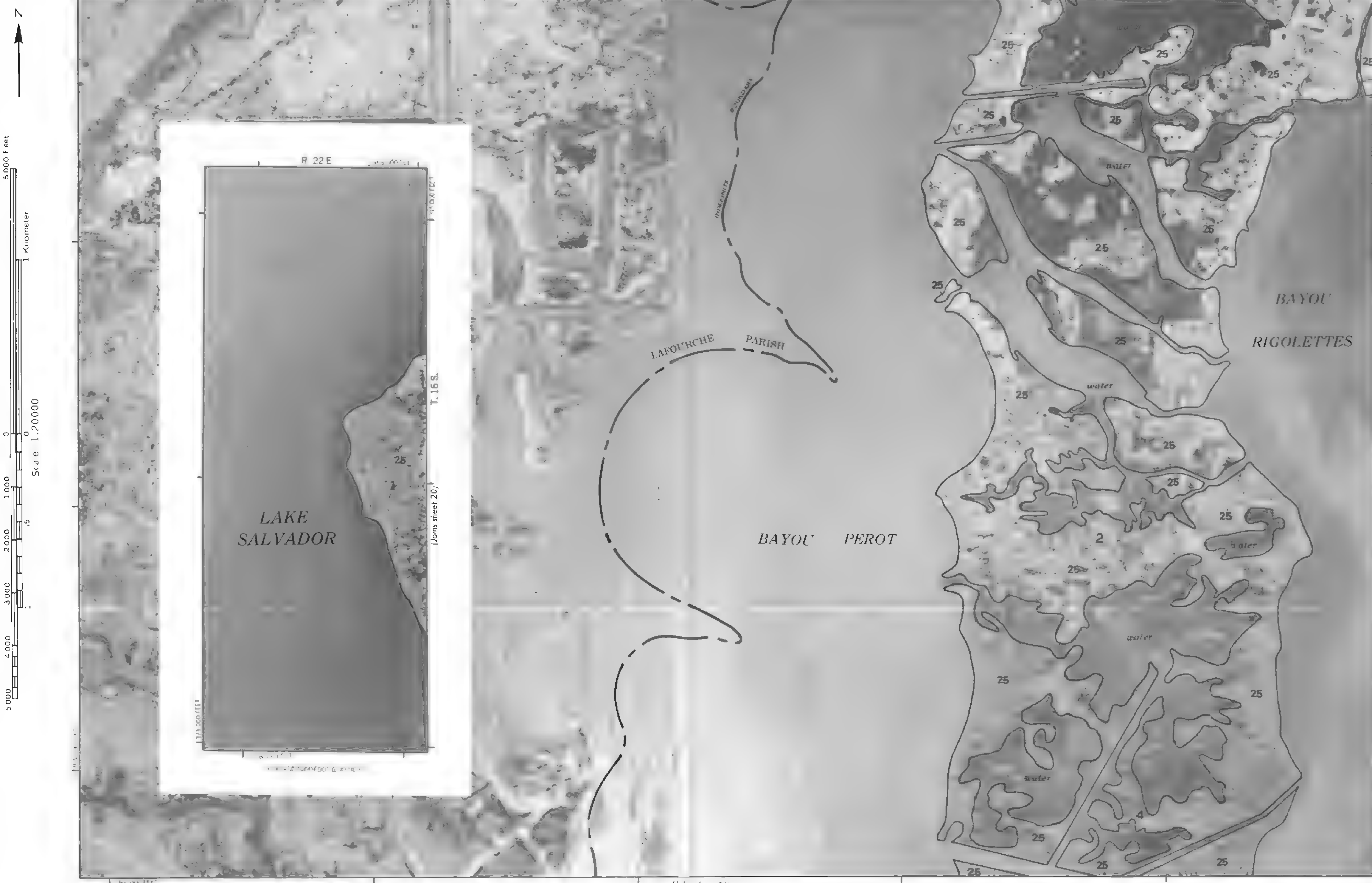
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA NO. 20

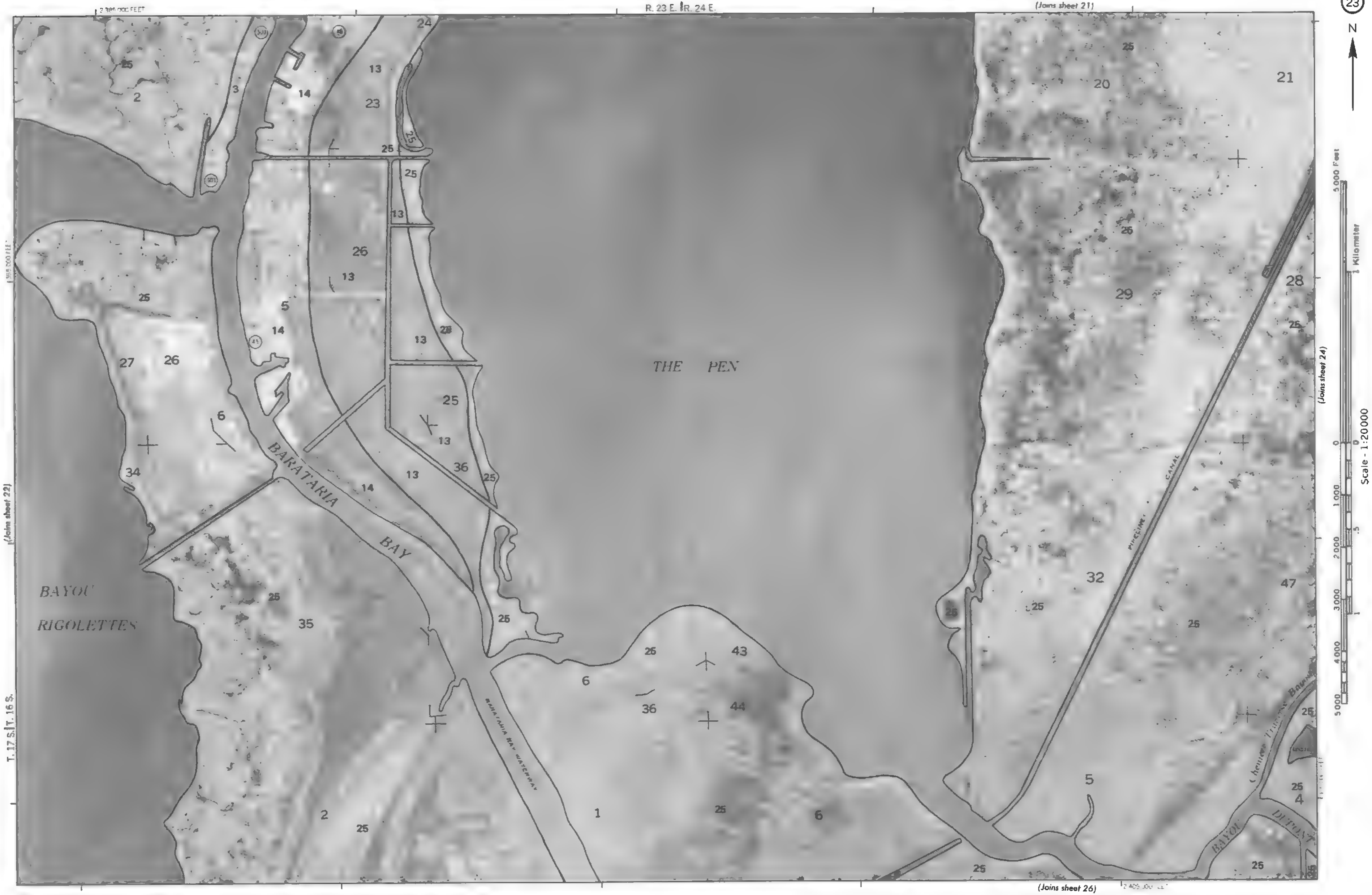


This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA NO. 21



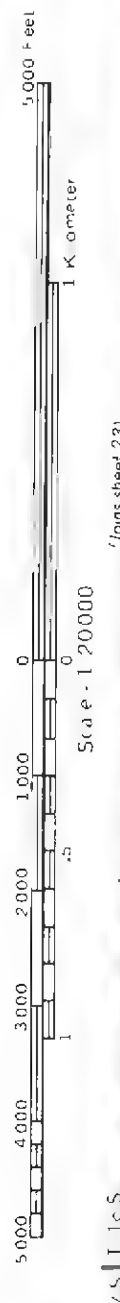
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.
JEFFERSON PARISH, LOUISIANA NO. 22

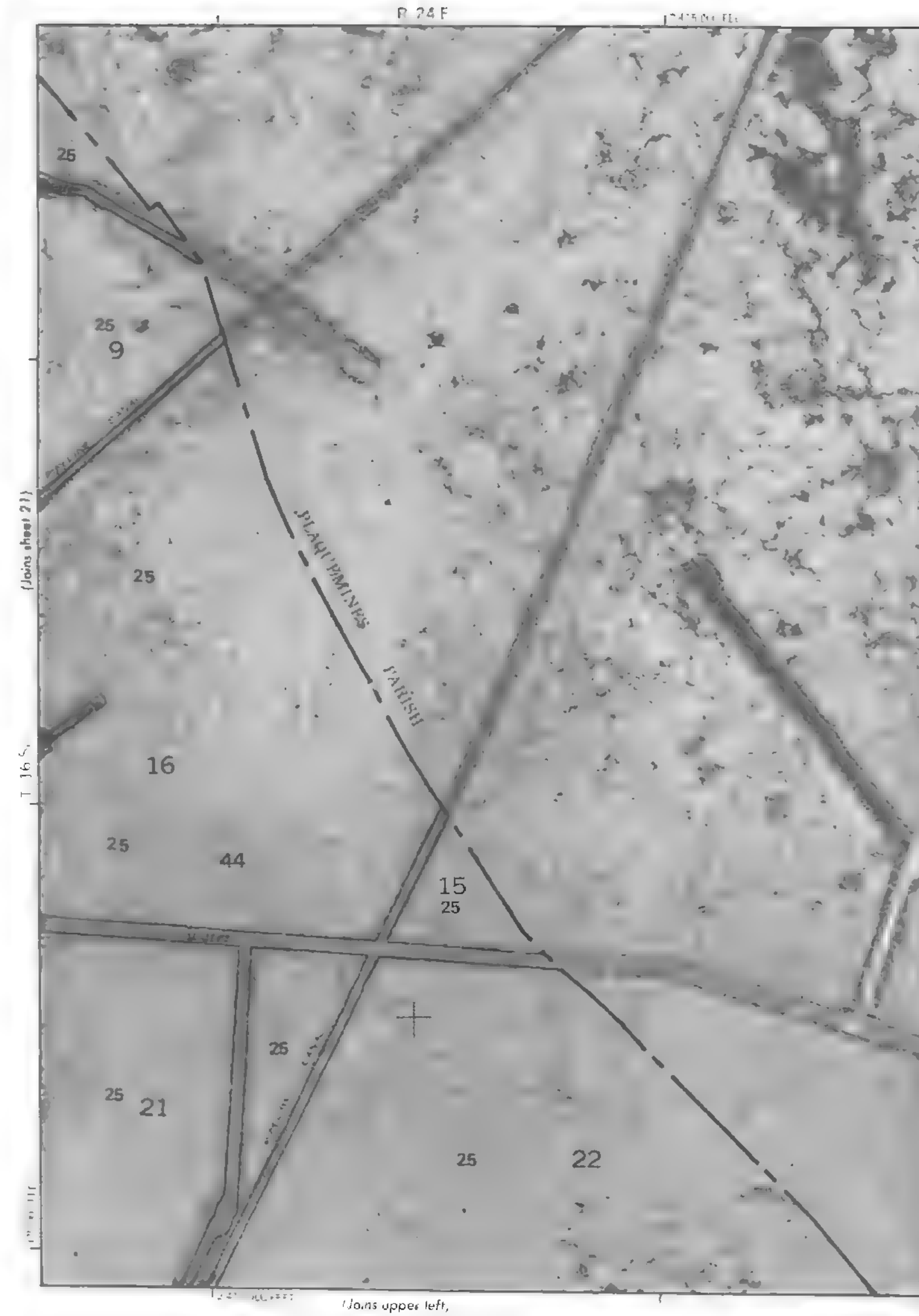


JEFFERSON PARISH, LOUISIANA NO. 23
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

24

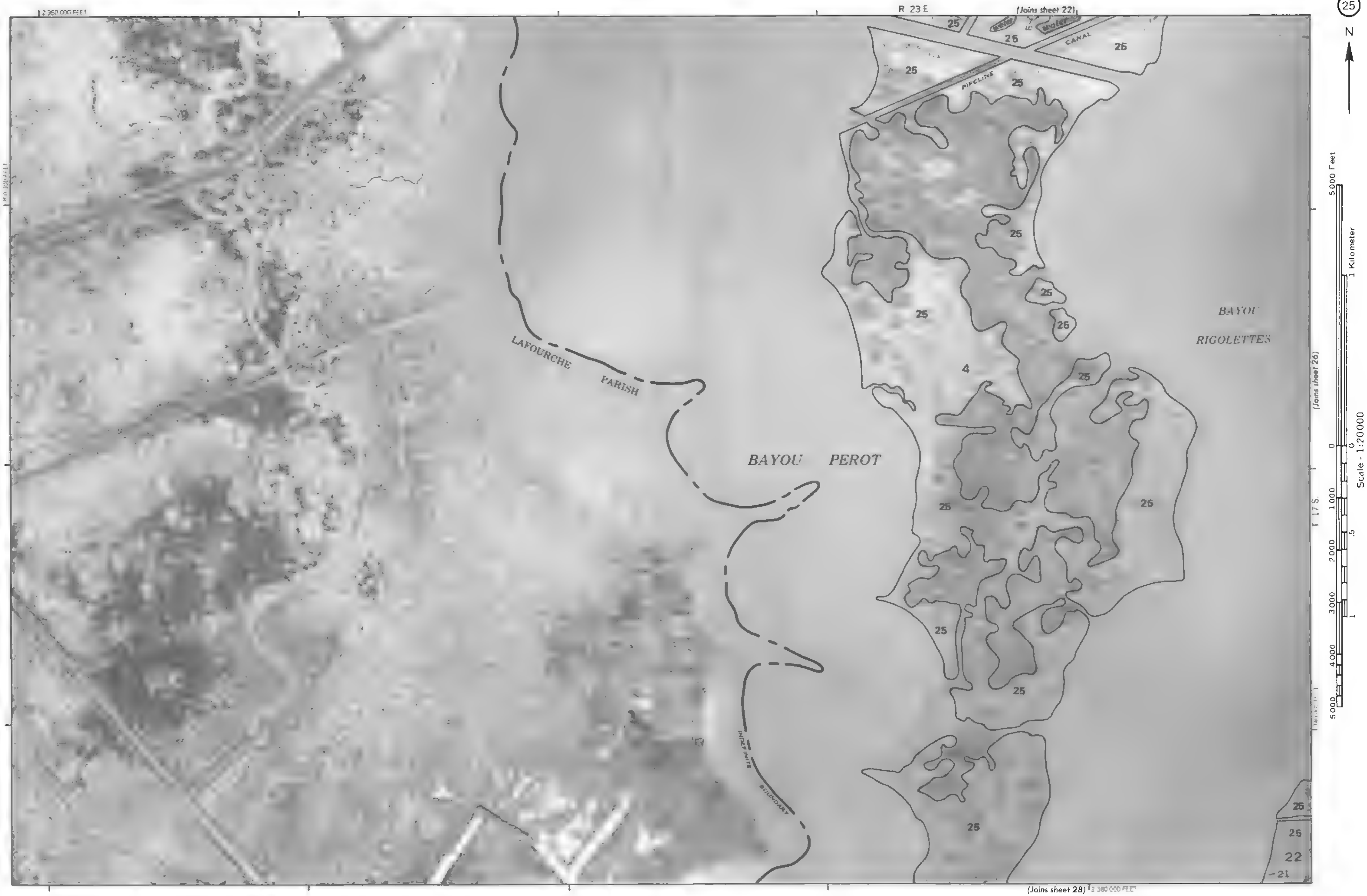
N





This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are orthophotographs prepared [illegible] Coordinate grid ticks and land division corners, if shown, are approximately positioned.

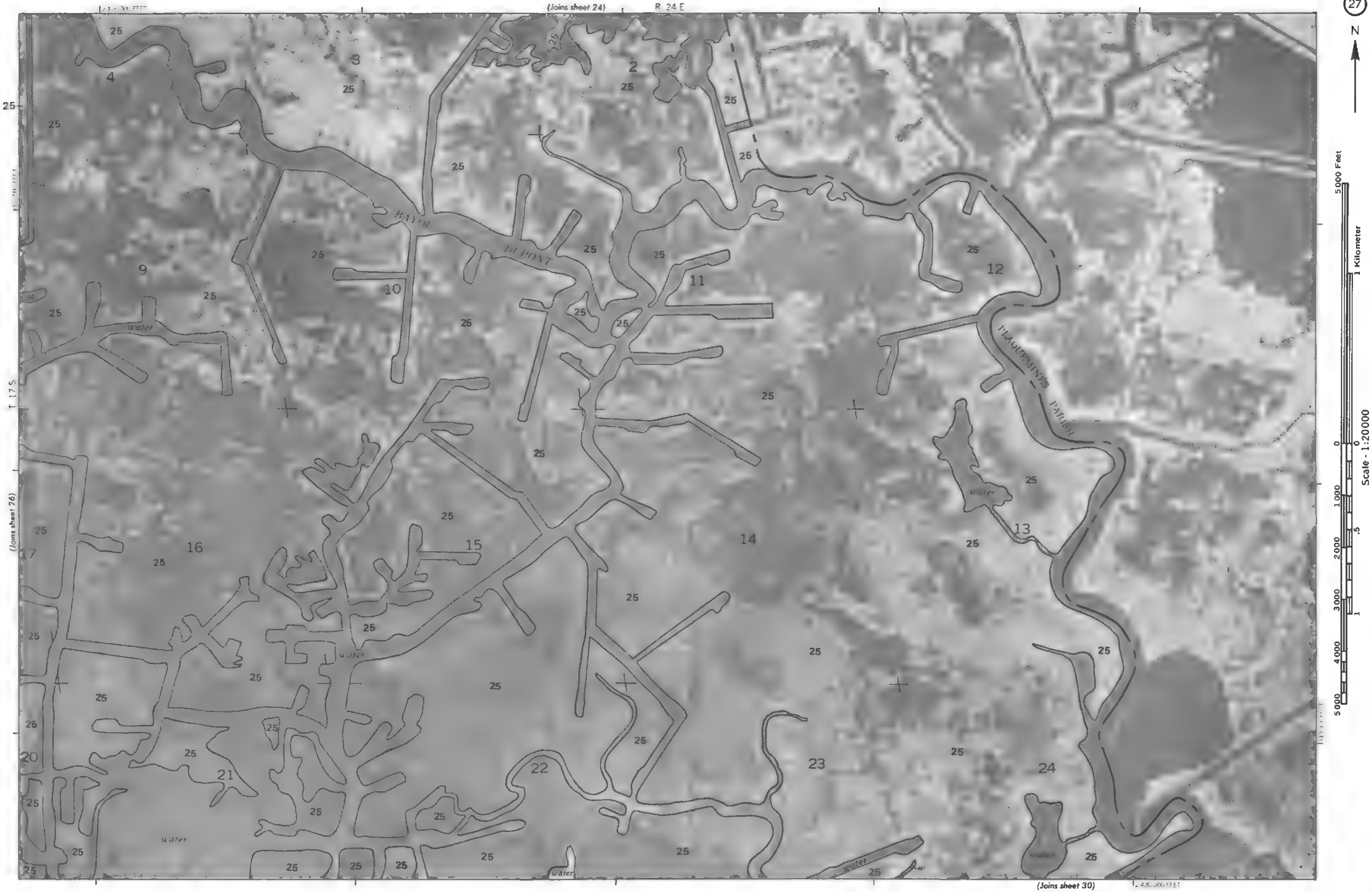
JEFFERSON PARISH, LOUISIANA NO. 24



JEFFERSON PARISH, LOUISIANA NO. 25

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

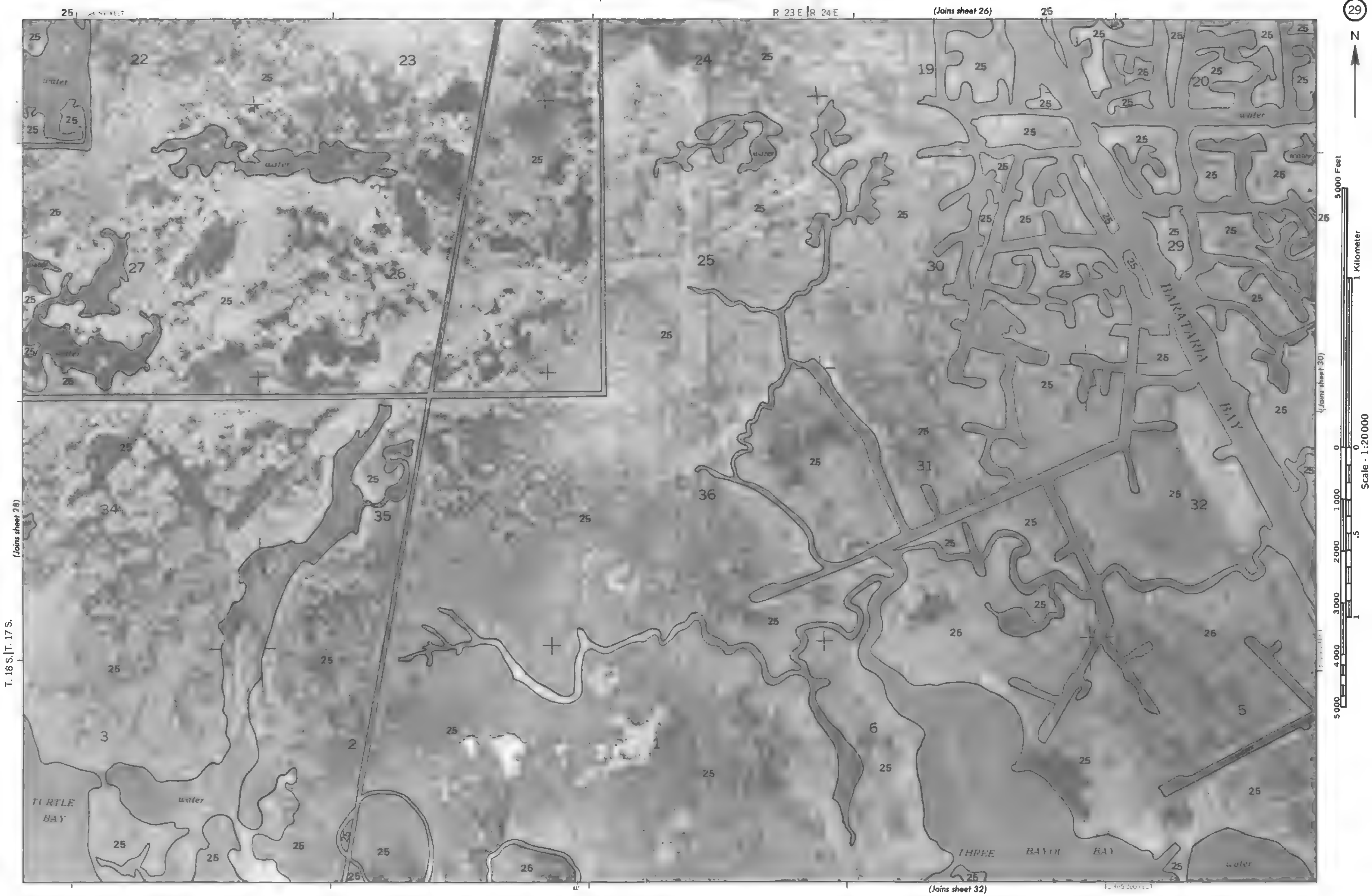
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



JEFFERSON PARISH, LOUISIANA NO. 27

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approx mately positioned.

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

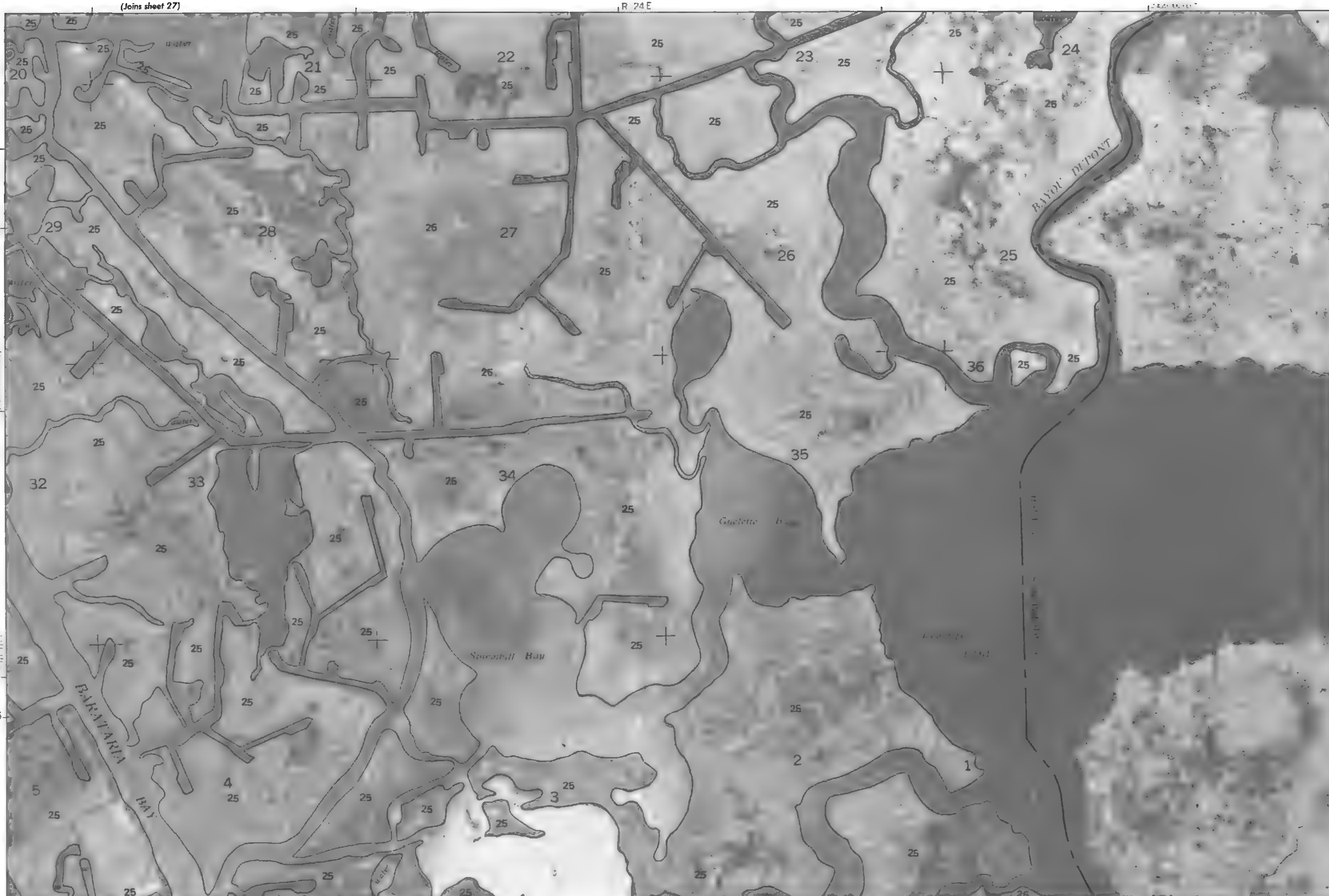


JEFFERSON PARISH, LOUISIANA NO. 29

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

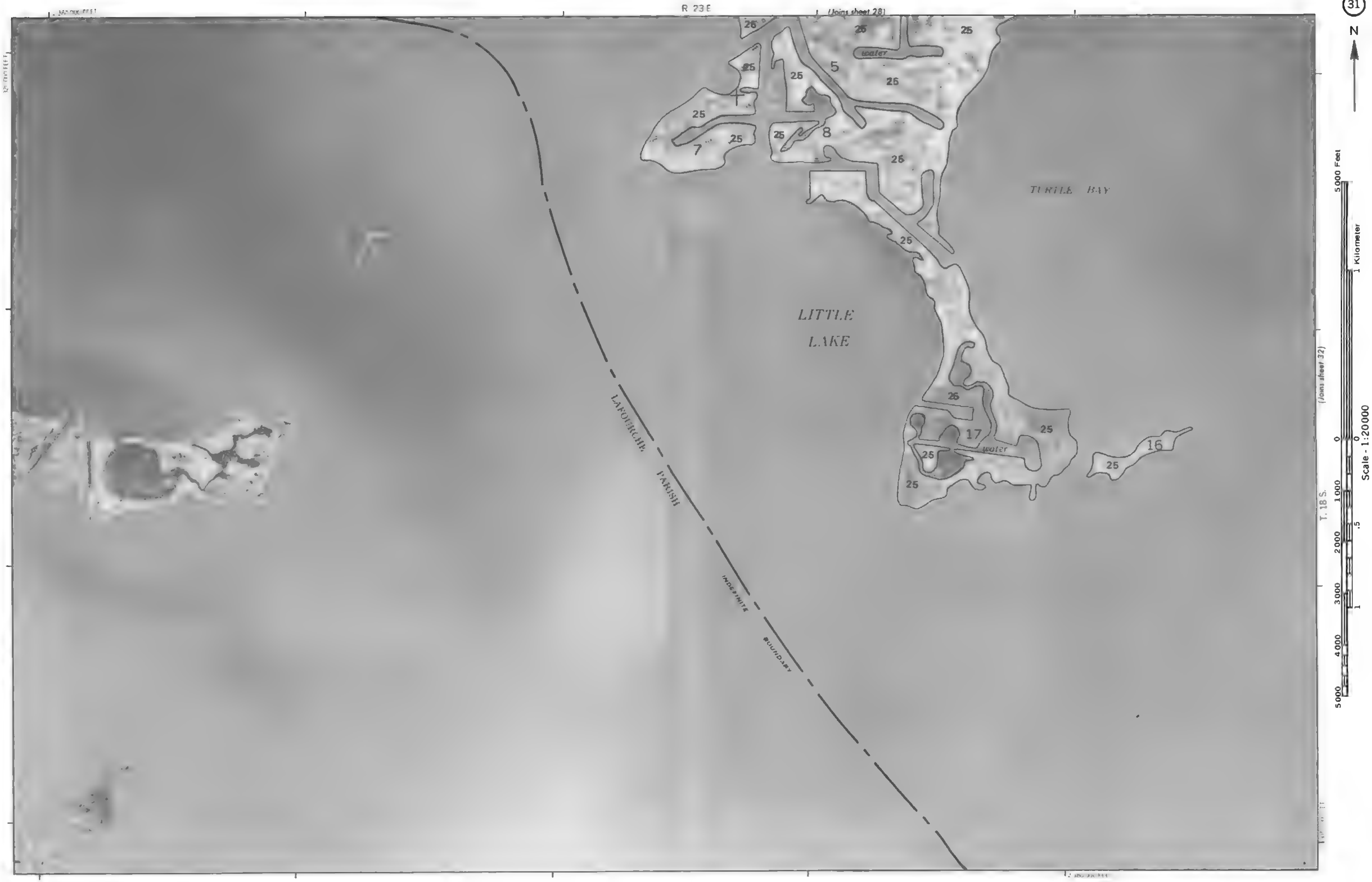
30

N



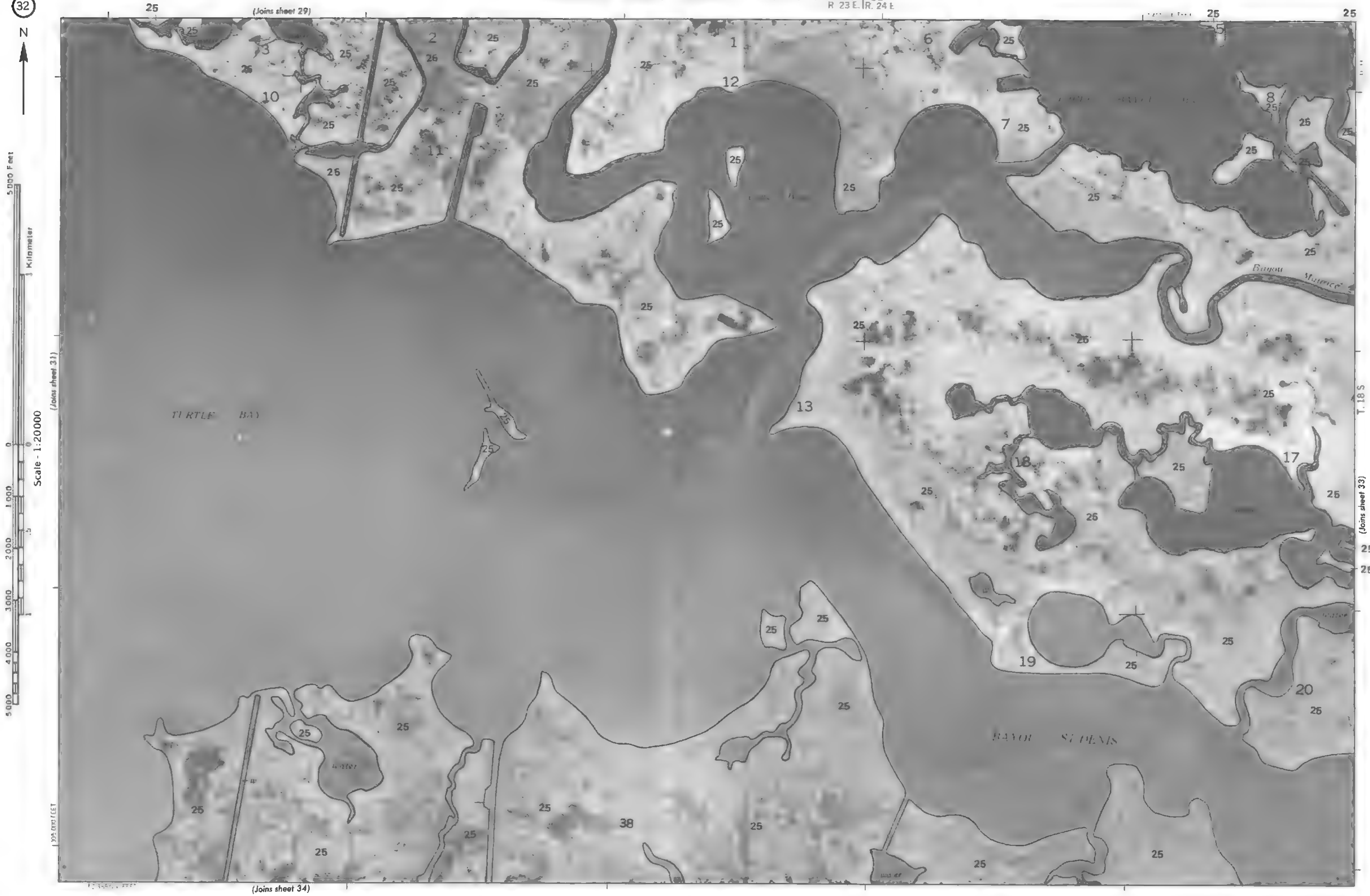
5000 Feet
1 Kilometer
Scale - 1:20000
0 1000 2000 3000 4000 5000
0 .5 1

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

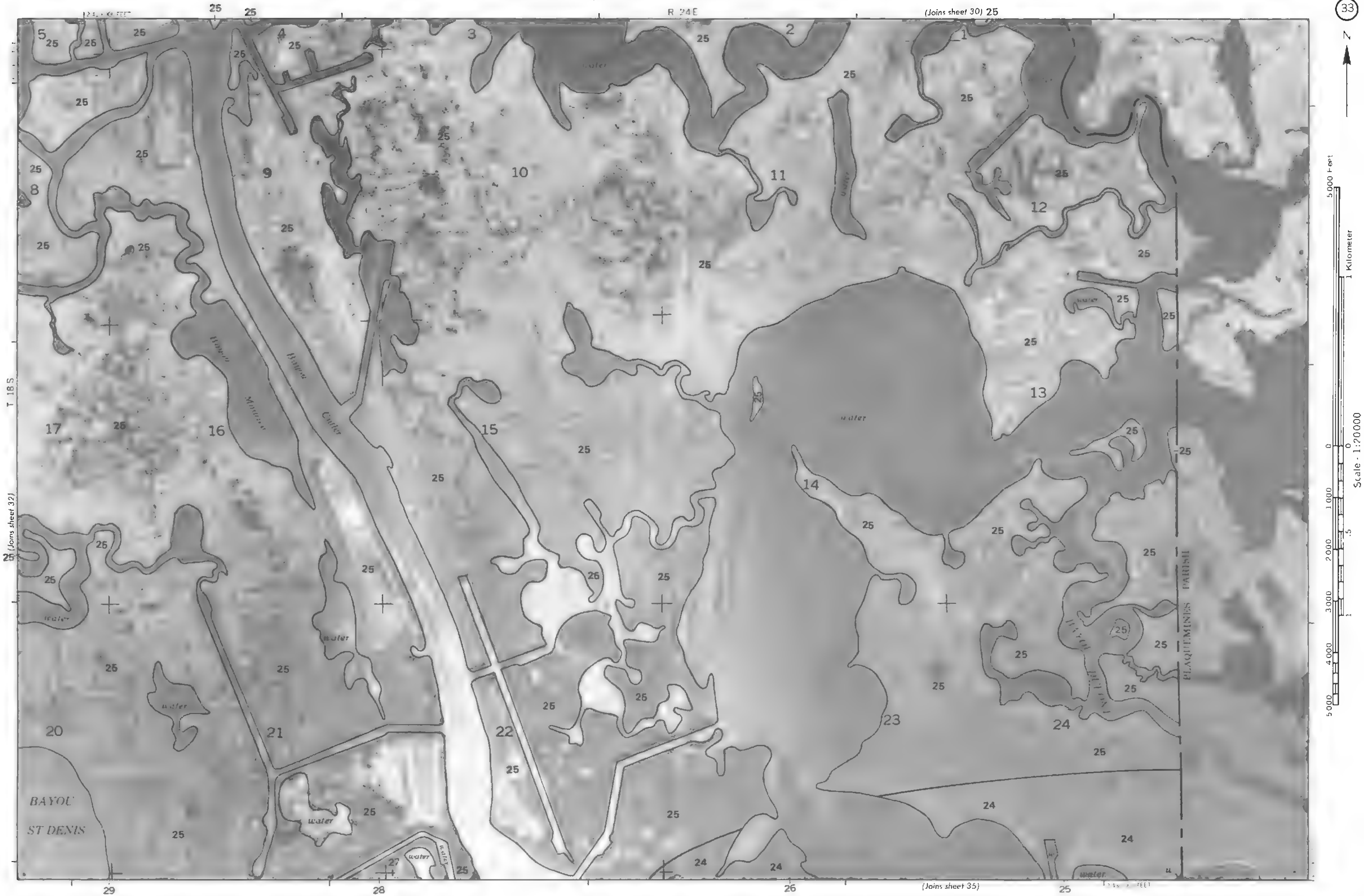


JEFFERSON PARISH, LOUISIANA NO. 31
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA — SHEET NUMBER 32



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

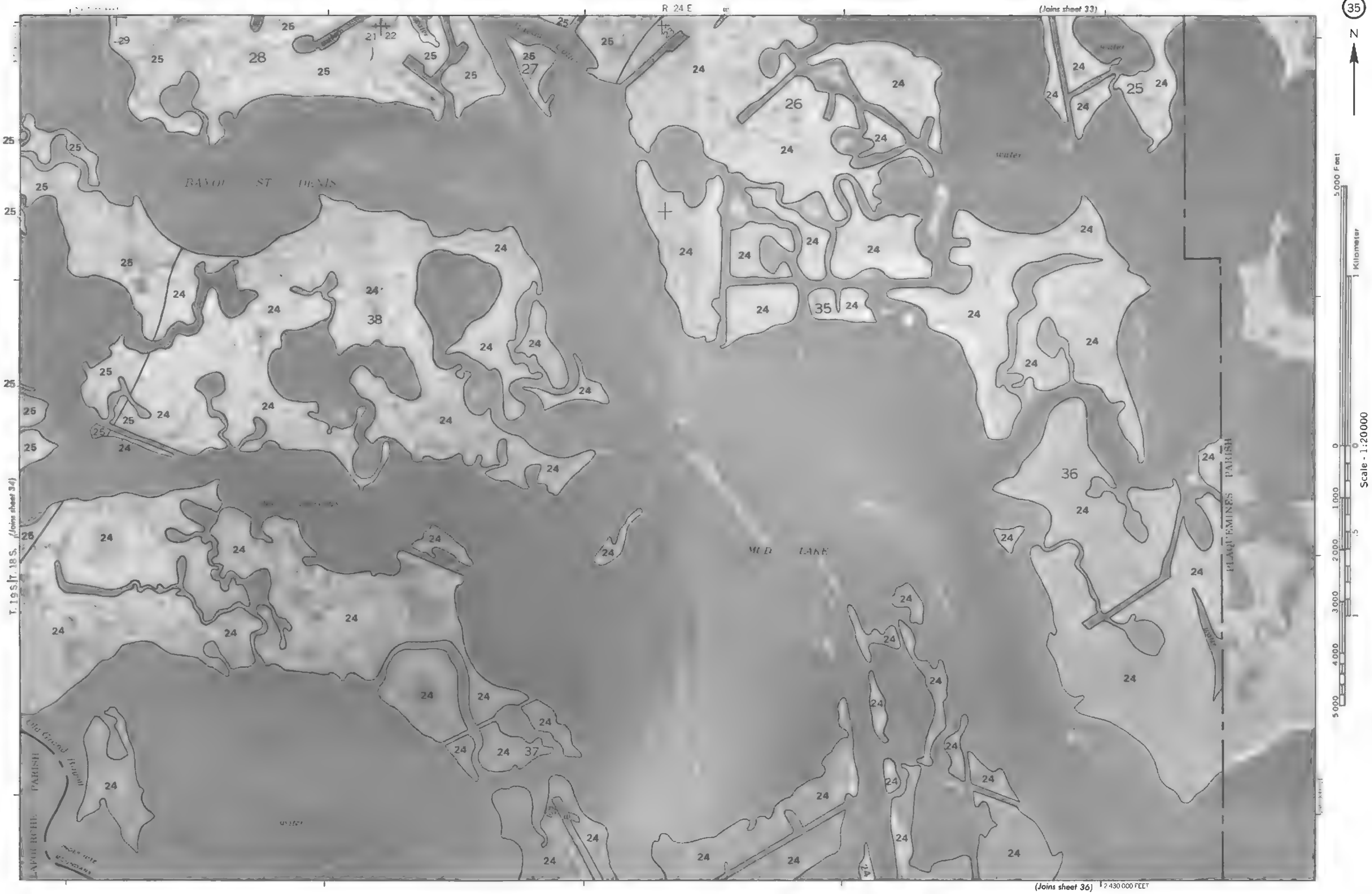


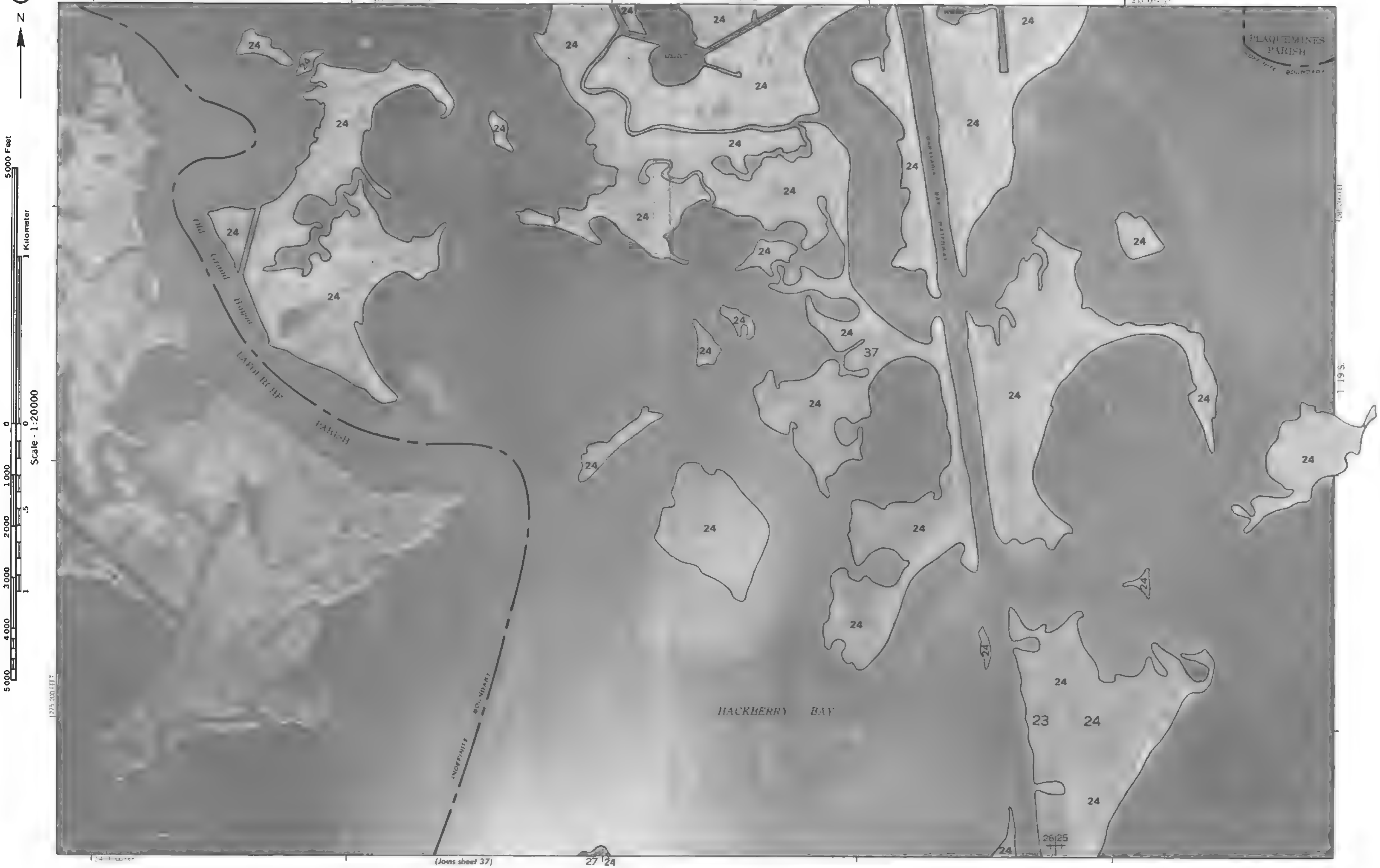
JEFFERSON PARISH, LOUISIANA NO. 33
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

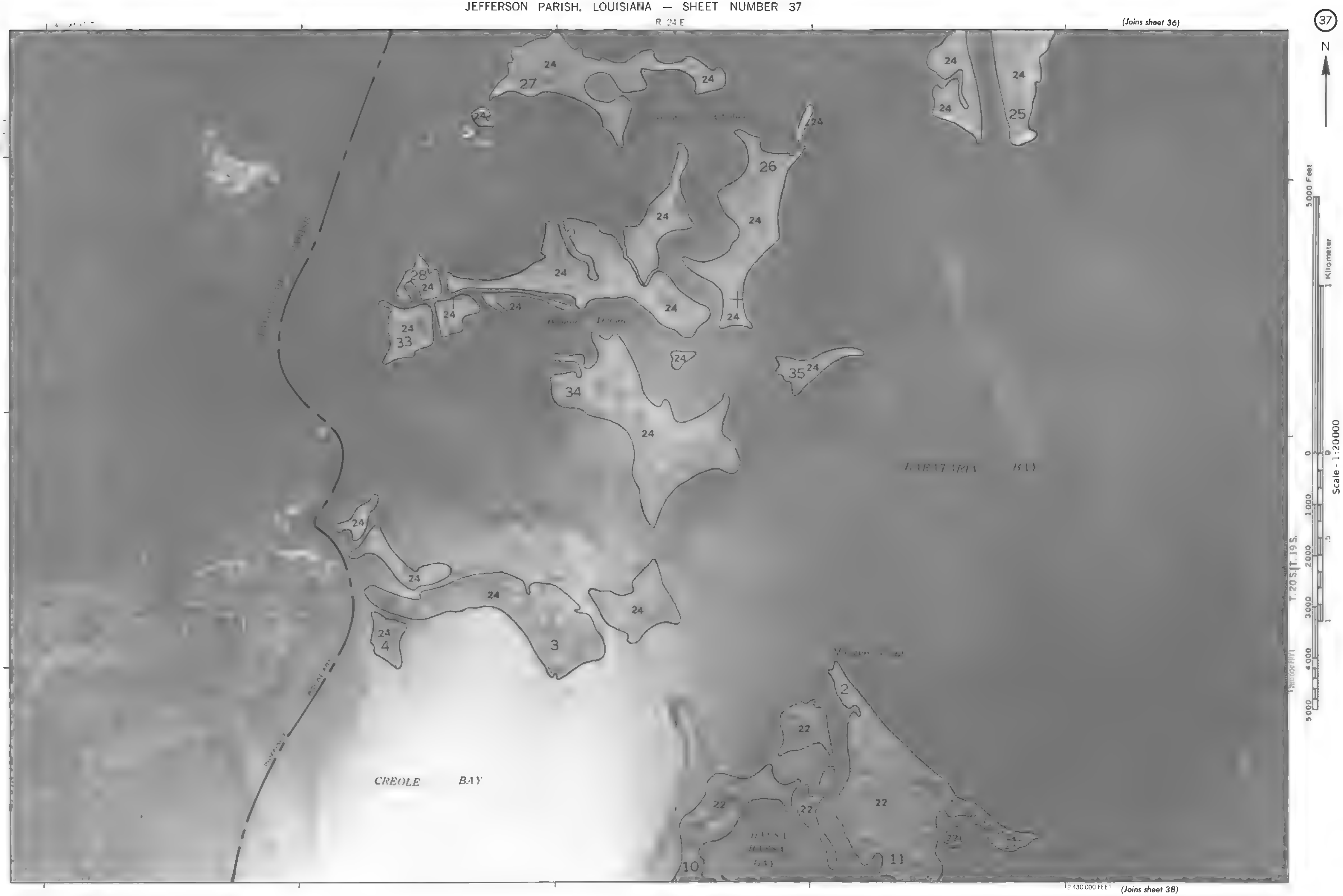
This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA NO. 35

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



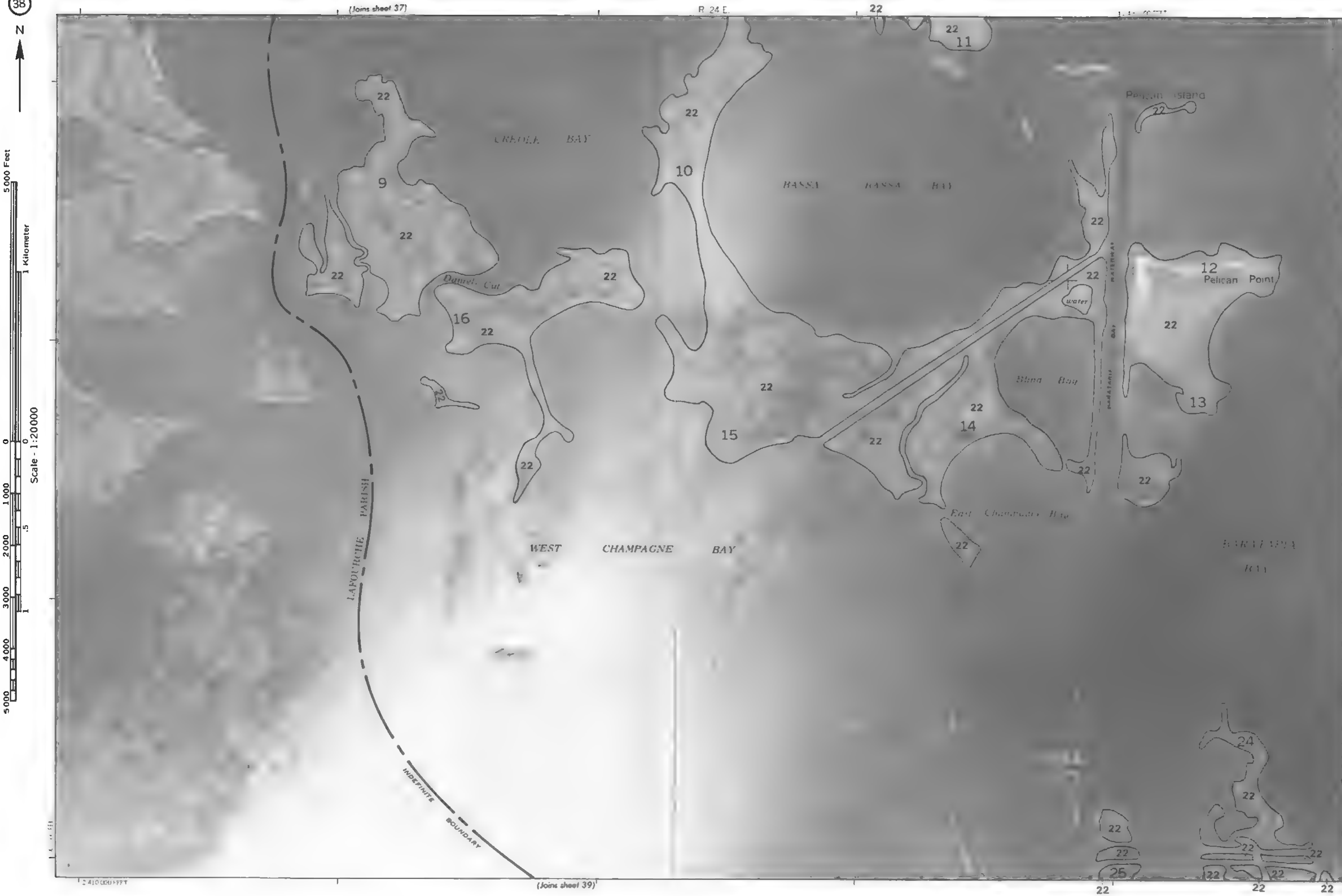

N
5000 Feet
1 Kilometer
Scale - 1:20000
0
1000
2000
3000
4000
5000
0
.5
1
(Joins sheet 35)
R 24 E
PLAQUEMINES PARISH
Old Grand Bayou
LAFOURCHE PARISH
INDEFINITE BOUNDARY
HACKBERRY BAY
T 19 S
(Joins sheet 37)
27 24
26 25
23
24
37



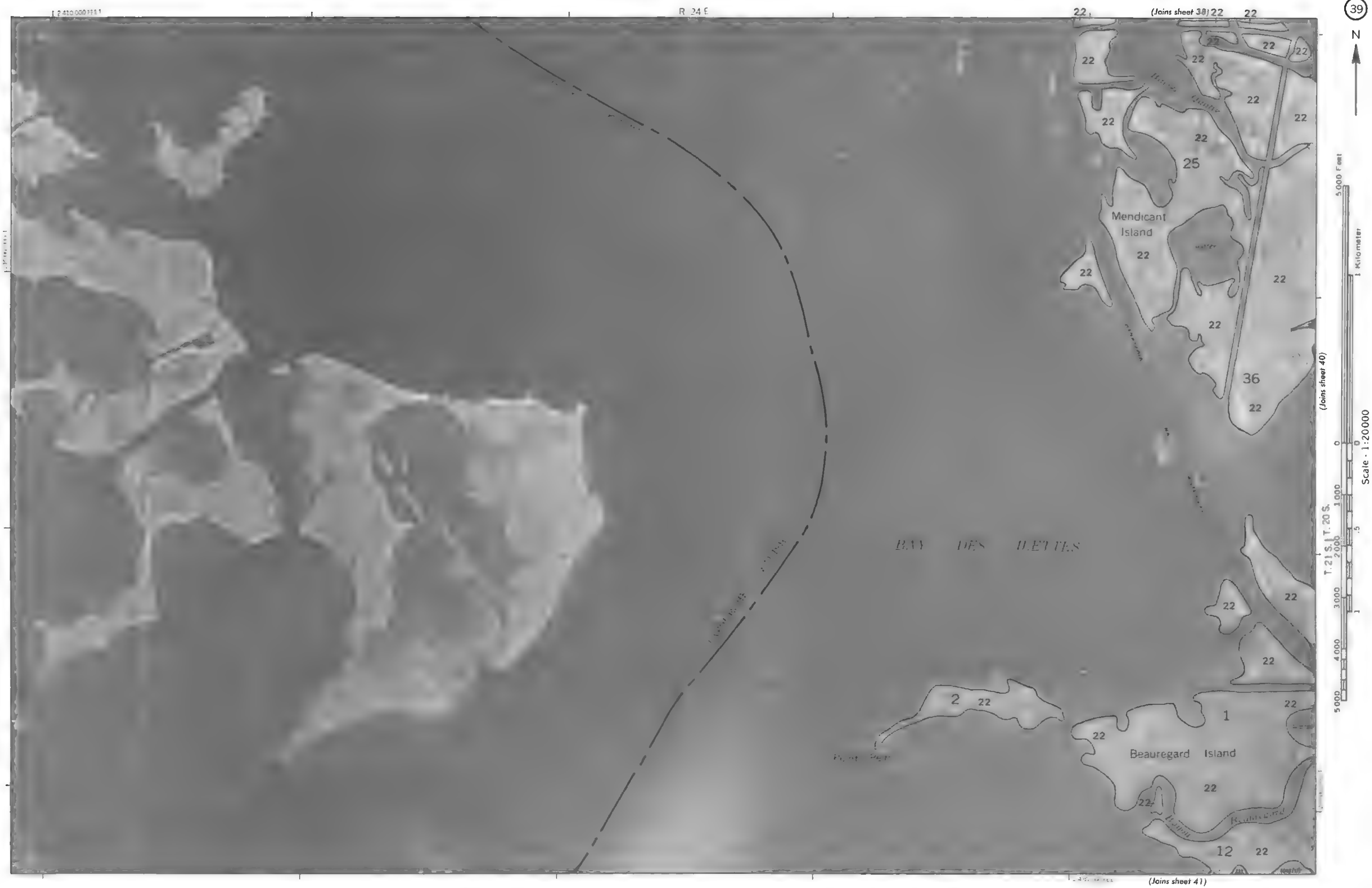
JEFFERSON PARISH, LOUISIANA NO. 37

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA — SHEET NUMBER 38



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.



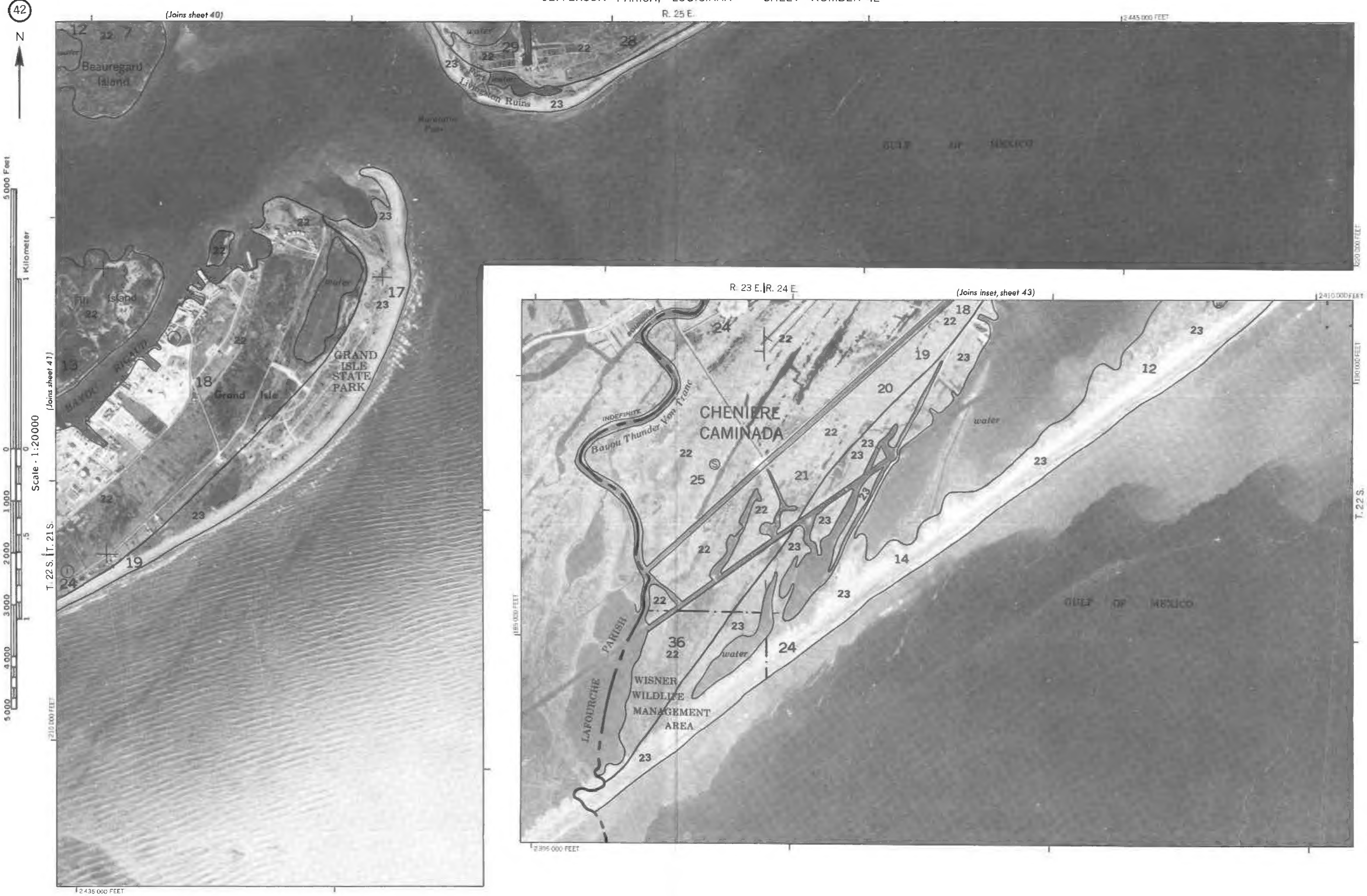
JEFFERSON PARISH, LOUISIANA NO. 39

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA NO. 41



This soil survey map was compiled by the U. S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1979 aerial photography. Coordinate grid ticks and land division corners, if shown, are approximately positioned.

JEFFERSON PARISH, LOUISIANA NO. 43